MARCH • 1959

Metal Products Manufacturing

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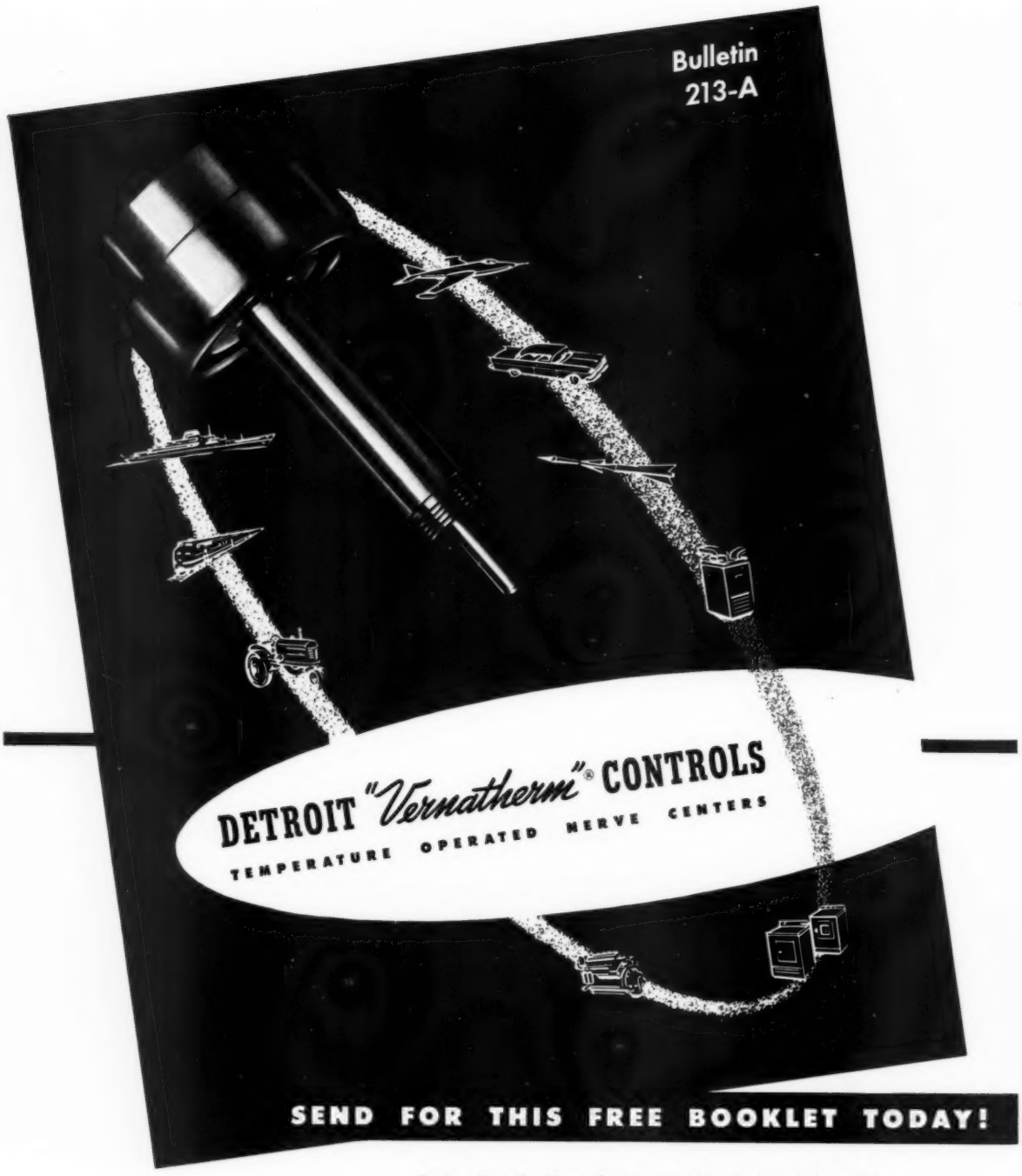
Serving the Appliance and Fabricated Metal Products Industry

Hot Spray Now an Aid to Finishing — Page 38

New Washer-Dryer Now in Mass Production — Page 34

Bonding Vinyl to Metal at 20 Feet Per Minute — Page 26



. . . it describes the Vernatherm control and where it is used in a variety of industries. The thermostatic element can lift up to a 250-pound load at temperature ranges from sub-zero to 450°F. Write to Detroit Controls Division of American-Standard, 5900 Trumbull Avenue, Detroit 8, Mich., for bulletin no. 213-A.

American-Standard and Standard ® are trademarks of American Radiator & Standard Sanitary Corporation.

AMERICAN-Standard
DETROIT CONTROLS DIVISION

How the Armco Stainless "Wardrobe" of Finishes Can Help You Save

No matter how they are finished on the outside, Armco Stainless Steels are always the same high-quality, corrosion-resisting steels all the way through. But you can save money by specifying the *one finish* from the Armco Stainless "wardrobe" that best suits your product's needs and requires the fewest additional finishing operations in your plant.

MANY ARMCO FINISHES TO CHOOSE FROM

Because they serve in many different products, Armco Stainless Steels are available in a wide variety of surface finishes.

Tough jobs call for workclothes. One of the unpolished surface finishes is generally most economical in high-temperature industrial uses, involving highly oxidizing or very corrosive atmospheres. On the other hand, when appearance, sanitation, or easy cleaning comes first, a polished stainless surface is required.

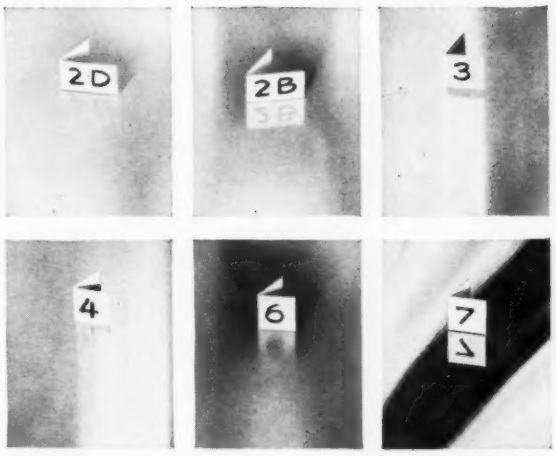
Patented Armco processes offer additional possibilities. Small parts and intricately-shaped pieces can be economically polished by Armco's electropolishing process. Another Armco process "Ebonizes" (blackens) stainless steel parts.

BROAD RANGE OF STAINLESS

Remember, too, Armco Stainless Steels are available in a wide range of standard and special grades—in gages, sizes, and shapes to suit design needs. For more information about Armco's Stainless Steels or their surface finishes, just fill in and mail the coupon or call your nearest Armco Sales Office.

Small or intricately-shaped stainless pieces like these can be economically polished by the Armco Electropolishing Process.

New steels are born at Armco



Pictured are six of the eight mill finishes available on Armco Stainless Steels. No. 2B and No. 2D Sheet Finishes correspond to No. 1 and No. 2 Strip Finishes, respectively. Not shown are the hot-rolled, annealed and pickled No. 1 Sheet Finish for industrial products and the new Armco SOFTONE Finish for Type 430 Stainless Steel strip. SOFTONE was developed to provide a soft, lustrous surface, yet avoid mirror-like reflectivity.

ARMCO STEEL CORPORATION, 1569 Curtis St., Middletown, Ohio

I would like more information about:

☐ Armco Stainless Steels

☐ These Armco Stainless finishes_____, _____,

_____, _____.

NAME_____

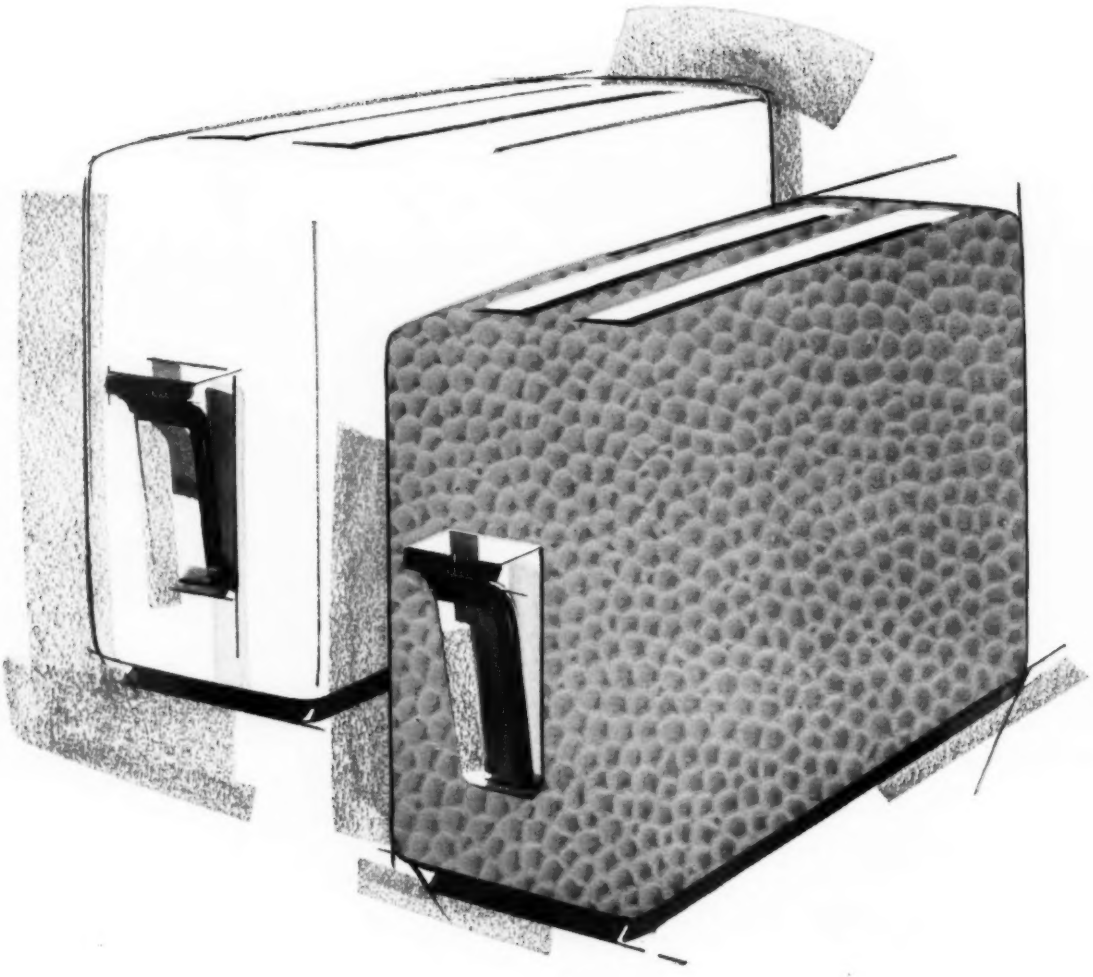
FIRM_____

STREET_____

CITY_____ ZONE____ STATE_____

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products



FIRESTONE MAKES YOUR TOASTERS "POP" WITH fashionized ALUMINUM PARTS

Call on Firestone's fabricating and finishing abilities in mass-produced parts and trim for home appliances.

Call on the brightest brightwork in the business to bring new sales appeal to your appliances. Whatever your product—wall oven, washer or waffle iron—Firestone can fabricate the finishing touch it needs to be noticed, and to stand out in stores.

Call on Fashionized Aluminum, and on Firestone's more than 50 years of metal-forming experience. Call, too, on the production capacities and competitive prices that only an automated anodizing line can give you. Your inquiries and inspections are cordially invited. Write, phone or wire today.

FIRESTONE FASHIONIZED ALUMINUM
FIRESTONE STEEL PRODUCTS COMPANY, AKRON 1, OHIO

MPM

(including finish)

MONTHLY TRADE PUBLICATION

Established January 1944

Published by

DANA CHASE PUBLICATIONS

York Street at Park Avenue, Elmhurst, Illinois
Telephones • TErrace 4-5280 • TErrace 4-5281

NBP BPA

MARCH • 1959

VOL. 16 • NO. 3

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METAL PRODUCTS MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is $8.00 per year, domestic. To all other countries $10.00 per year (U.S. funds). Single copies, $1.00.

Editor and publisher • DANA CHASE
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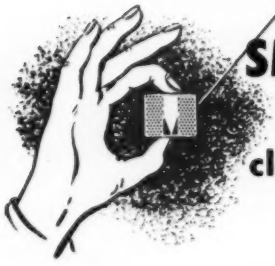
LARGE enough to handle big jobs—



SMALL enough to give every job close personal attention

Charles Mundt & Sons are specialists in perforated metal design and production. Through 89 years of experience we have gained the "know-how" and developed the organization and production facilities to handle the big perforating job. Yet we have never outgrown the basic policy of maintaining a close working relationship with our customers. Our organization provides you with the best in service and personal attention and you deal direct with the people who have the full responsibility for your satisfaction.

With perforated metals you have a wide horizon to explore. New design opportunities are limited only by the imagination. We have ideas gained through our many years as specialists in the use of perforated metals. We'd like to share these ideas with you.

Perforating Specialists of All Types of Metals

Write for your free copy of "Perforated Metals for Every Purpose".

CHARLES MUNDT & SONS

55 FAIRMOUNT AVENUE • JERSEY CITY 4, N. J.

from the Editor's Mail

The importance of service

Gentlemen: I am pleased to know that one of the pet editorial themes of your magazine is "service."

If more magazines would adopt this attitude, it would go a long way in helping to provide much needed, better service on products generally.

There is growing evidence that the temper of the American public is such that they are going to demand good service.

Arthur E. Maling, Manager, Technical Service
Carrier Corp., Syracuse, N. Y.

Desires information on cleaning

Gentlemen: In your October, 1958 issue, there is an article on two-stage cleaning as done by the Andrew Wilson Co.

We would appreciate your giving us the address of the Wilson Co., and who to contact there to find the name of the cleaning solution as described.

Arthur A. Folsom, President
The Folsom Co., Inc.
Dallas, Texas

The Andrew Wilson Co. is located in Lawrence, Mass., and the material used in the two-stage cleaning setup is Oakite CrysCoat No. 47. Eds.

Plastic tooling article of interest

Gentlemen: Your review in the January, 1959 issue of MPM covering the topic "Plastic tools simple to make," was so very interesting and thought provoking.

Will you please forward to us the names and addresses of companies, known to you, that have available Epoxy Resin Compounds equal to the job as described in your article?

D. B. Walper
Drow Mfg. Co.
Wayne, Mich.

The keen interest in plastic tooling is evidenced by the fact that, when MPM has run short features on the subject in the past, the letters from readers have run into the hundreds. Eds.

Enthusiasm is contagious

Dear Mr. Chapple: Your guest editorial in the February issue of METAL PRODUCTS MANUFACTURING has re-fired my enthusiasm.

We have a business which is so fascinating that I am forever talking about it, explaining it to people who are probably no more interested in operating cologne spray dispensers than you were in operating a chicken farm. However, I hope that I am as successful in making

the public as aware of our products as the young salesman was in capturing your interest.

My job is, of course, to sell our machines via advertising. Perhaps some might consider it a waste of time when I discuss our machines, their use, and their potential with those who are not in the field. However, information shared knows no limiting boundaries and, as the public becomes aware of a product, its acceptance (and subsequently, its use) is assured.

Mr. Savage and I have built our business from "scratch," and are almost as proud of it as we are of our two children. Thank you for assuring me through your editorial that we are on the right track.

Enthusiastically

Mrs. Martha S. Savage
Advertising Manager
Colma, Inc., Worcester, Mass.

The article to which Mrs. Savage refers is "Chicken feed and metal products," written by Bennett Chapple, a retired executive of Armco Steel Corp., Middletown, Ohio, and which appeared on Page 17 of the February, 1959 issue of MPM. Her letter has been forwarded to Mr. Chapple. Eds.

Gentlemen: Would you please grant me permission to reprint the article entitled "The Finish Line", "Chicken feed and metal products", the guest editorial by Bennett Chapple, which appeared in the February, 1959 issue of METAL PRODUCTS MANUFACTURING.

This article will be used in a daily issue of The Reporter which has a circulation of 1,500 within our plant.

Mrs. Mabel T. Anderson
Associate Editor, The Reporter
General Electric Co., Industry Control Dept.
Roanoke, Virginia

Gentlemen: I was much interested in the editorial in your February issue of METAL PRODUCTS MANUFACTURING, and I'm having a copy made of it for use with my salesmen. . .

You will recall that, many months ago, you ran an article having to do with the possibility of permanent magnets being used in latches on appliances. You will be interested to know that Whirlpool-Seeger, Westinghouse Electric, and General Electric are all using permanent magnets for latches on their refrigerators. Additionally, GE uses them for automatic dryers.

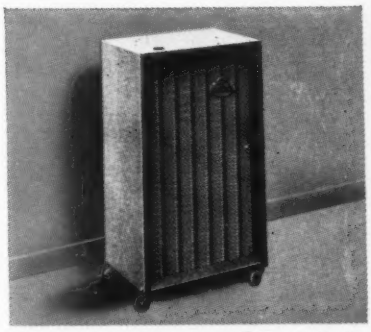
P. M. Wheeler, Sales Manager
The Indiana Steel Products Co.
Valparaiso, Ind.

From Peoria to Grand Rapids

Gentlemen: Just a line to let you know I have been transferred to Grand Rapids from Peoria, Ill. Would appreciate if you would please change my mailing address to 49 N. Prospect Ave., N. E., Grand Rapids 3, Mich. Thanking you and looking forward to the forthcoming

to Page 79 →

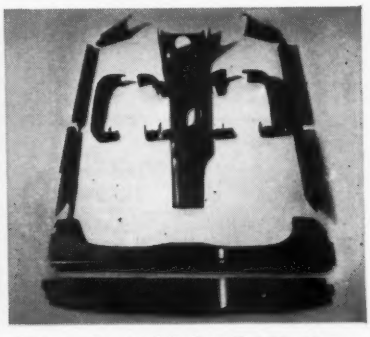
Which of these PRODUCT IMPROVEMENTS can step up your sales?



Smarter appearance? Ebco's Oasis dehumidifier is high-styled with a cabinet of tweed-finish COLOVIN vinyl laminated to steel. Case is pierced, notched, drawn and formed on same equipment that is used for metal alone.

Strength without weight? By using COLOVIN vinyl laminate, Samsonite creates a spectacularly modern shape in luggage that combines the weightlessness and strength of magnesium with the look and feel of top-grain leather.

Indestructible finish? At the Brussels Fair this handsome Atomium corridor featured bulkheads of linen-finish COLOVIN vinyl laminated to steel. Despite the abuse of heavy traffic, both color and finish remained fresh.



Ease of machining? All these parts of the Thunderbird interior are formed from leather-finish COLOVIN vinyl-on-steel. The laminate is machined on standard equipment, requires no painting, finishing, or costly hand operations.

Get them all with this new material!

Colovin vinyl permanently bonded to steel, aluminum, magnesium or wood offers unlimited possibilities for restyling painted products with the authentic look and feel of fine fabrics or leathers. In production it can be machined and formed on standard equipment as precisely as metal alone, is even more damage-proof, and requires no painting, finishing or costly hand operations.

Get the whole story in "COLOVIN Meets Metal." Laminate samples, colors and textures, test specifications, industrial applications, and list of laminators to whom we supply COLOVIN vinyl sheeting. Mail coupon.

COLOVIN®

first and finest in vinyl laminates

COLUMBUS COATED FABRICS CORP., Dept. MM-359, Columbus 16, Ohio

Please send me your brochure, "Colovin Meets Metal."

Name_____

Company_____

Address_____

City_____ Zone___ State_____

Clare Brothers
LIMITED • PRESTON, ONTARIO

WORLD-WIDE ACCEPTANCE

FOR PER

PERMA-VIEW oven door windows are the standard with leading range manufacturers in the United States, from Coast to Coast. Now they are fast becoming standard for leading manufacturers in other countries, too, as these

RADIATION NEW ZEALAND LIMITED

THE Enterprise FOUNDRY COMPANY LIMITED

THE GUELPH STOVE CO. LIMITED
MANUFACTURERS OF
STOVES RANGES AND FURNACES

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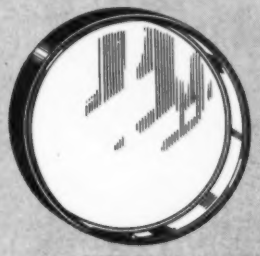
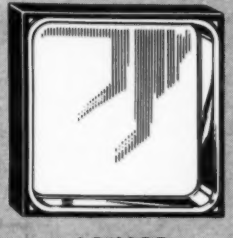
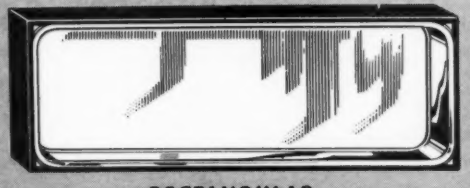


ROUND



SQUARE



RECTANGULAR

TRAPEZOID

We can manufacture any shape, and size, and thickness to meet your engineering requirements.

DE ETNA
BREDA, NETHERLANDS

GENERAL STEEL WARES LIMITED

BRANTFORD WASHING MACHINES LIMITED

RMA-VIEW

Gurney PRODUCTS LIMITED

Canadian Admiral CORPORATION, LTD.

P. J. Manufacturing, Incorporated

McCORMACK SMYTH LIMITED

SUNSHINE WATERLOO CO. LIMITED
WATERLOO, ONTARIO

manufacturers learn of the sales advantages of the PERMA-VIEW "No-Fog" window. From Canada to Europe—to Australia or South Africa —PERMA-VIEW is recognized as the finest and most economical oven door window.

(The accompanying names and trademarks represent some of the present users outside the United States.)

The strong steel encased, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." For the homemaker it presents an "invitation to buy."

BEACH Foundry LIMITED

LA FONDERIE DE L'ISLET
LIMITEE
Manufacturiers de
POÊLES • FOURNAISES • LAVEUSES

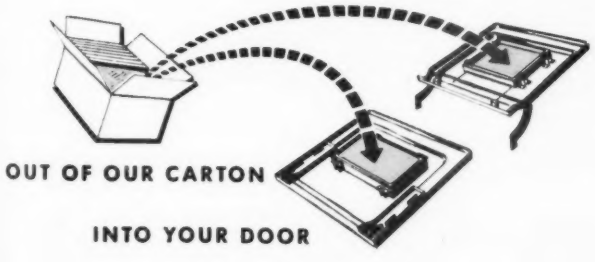
THERMAX LIMITED

The PERMA-VIEW window is pre-engineered, and comes to you ready for immediate installation in your range. "Out of our carton into your door." Let our specialized production lines serve as a part of your sub-assembly facilities. If you do not use a window, if you make your own window, or if you buy your window from another source, we suggest you phone or write us for complete details on the ease and economy of adding this sales feature to your new ranges.

A. BELANGER LIMITED

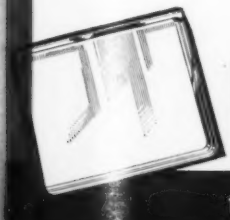
METERFABRIEK
(MAATSCHAPPIJ TER VERVAARDIGING VAN GASMETERS, ENZ.)

Husqvarna Vapenfabriks Aktiebolag
Huskvarna - Sweden



CANADIAN WESTINGHOUSE COMPANY • LIMITED

Alternate methods of attachment may be used.



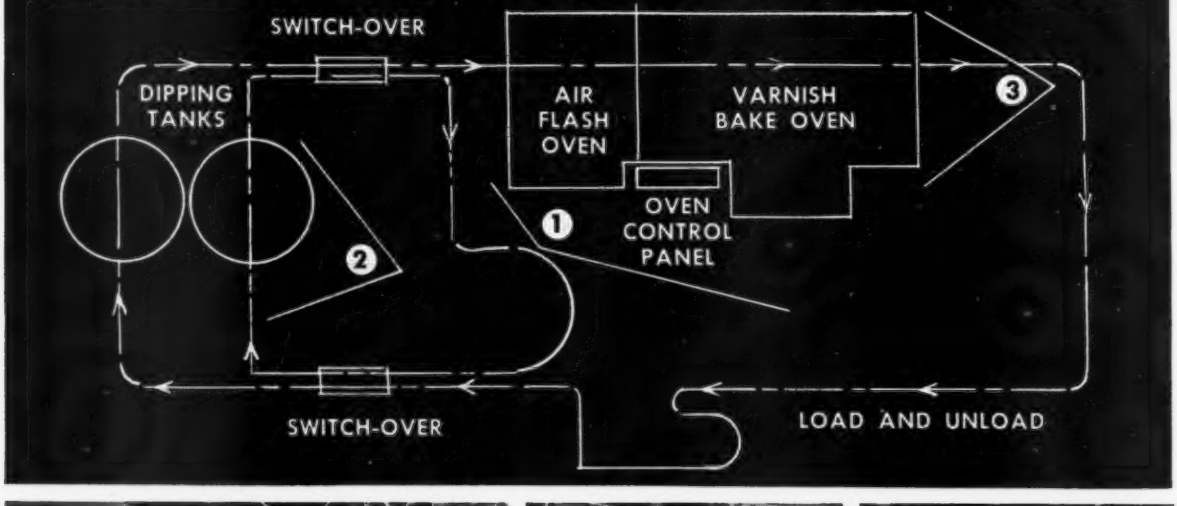
MILLS PRODUCTS INCORPORATED

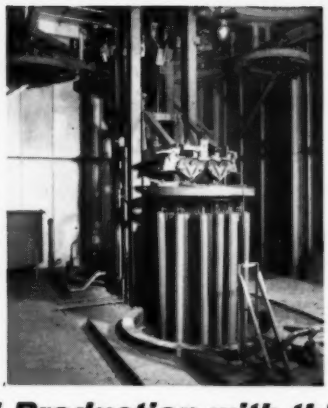
1015 WEST MAPLE ROAD • WALLED LAKE, MICHIGAN

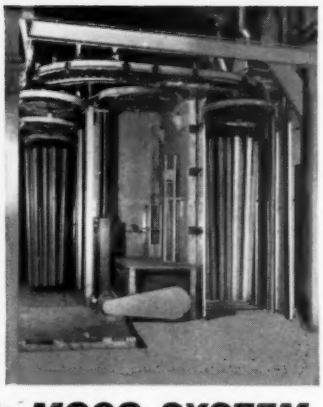
THIS IS A GENUINE PERMA-VIEW PATENTED NON-FOG WINDOW

INTEGRATED

FINISHING SYSTEM DESIGNED FOR TODAY'S PRODUCTION . . . TOMORROW'S POTENTIAL







WALKER BROS. has Doubled Production with this MOCO SYSTEM

Custom-engineered for Walker Brothers of Conshohocken, Pa., manufacturers of quality electrical distribution materials, this Michigan Oven Finishing System is *integrated* for increased product quality, lower operating cost and greater safety. All with higher production volume.

The MOCO ovens shown above feature design simplicity, hazard proof construction, with numerous safety features. Designed to speed the application of an acid and alkali resistant enamel coating over the zinc coated steel electrical conduit, the MOCO installation has doubled former production, even though it is presently operating at only 50% of its rated capacity.

Alternate dipping system uses two tanks, each with separately-controlled, variable rate of immersion, withdrawal, and dwell time. Conveyor layout permits the use of either or both tanks at any time. MOCO Integrated Finishing System includes tank, filters and pumps, as well as complete heating and temperature control equipment for the enamel coating.

Enameled conduit, 10 ft. long and up to 6 inches in diameter, pass through 105° Air Flash Oven, then through the 450° Bake Oven. Overlapping exit doors (above) help maintain even temperature within the Bake Oven. Conveyor holds up to a ton of conduit on each rack, moves 6′0″ every six minutes; conduit passes through both ovens in 24 minutes. Except for loading and unloading of racks, entire operation is automatic.

FREE—Send for your MOCO bulletin showing typical finishing system applications and specifications, or write for the name of the MOCO Representative nearest you.

MICHIGAN OVEN COMPANY

MOCO

FINISHING EQUIPMENT DEPARTMENT
411 BRAINARD, DETROIT 1, MICHIGAN

Washing Machines • Bonderizing Units • Dry-off Ovens • Dip Tanks
• Spray Booths • Flo-coaters • Finishing Ovens • Conveyors

Take a good look at any ordinary tapping screw. See for yourself how the last thread deteriorates just under the head. That deterioration means you lose a portion of the engagement in every fastening operation. It often means slippage during final tightening—a "spinner" which must be removed and replaced. ■ With the revolutionary P-K *Hi-thred*, you get *full engagement* with the material—a bulldog grip throughout the entire length of the screw BECAUSE THE *Hi-thred* IS THREADED FULL TO THE HEAD . . . THE THREAD ACTUALLY TERMINATES IN AN ANNULAR ORIFICE IN THE HEAD ITSELF! ■ Next

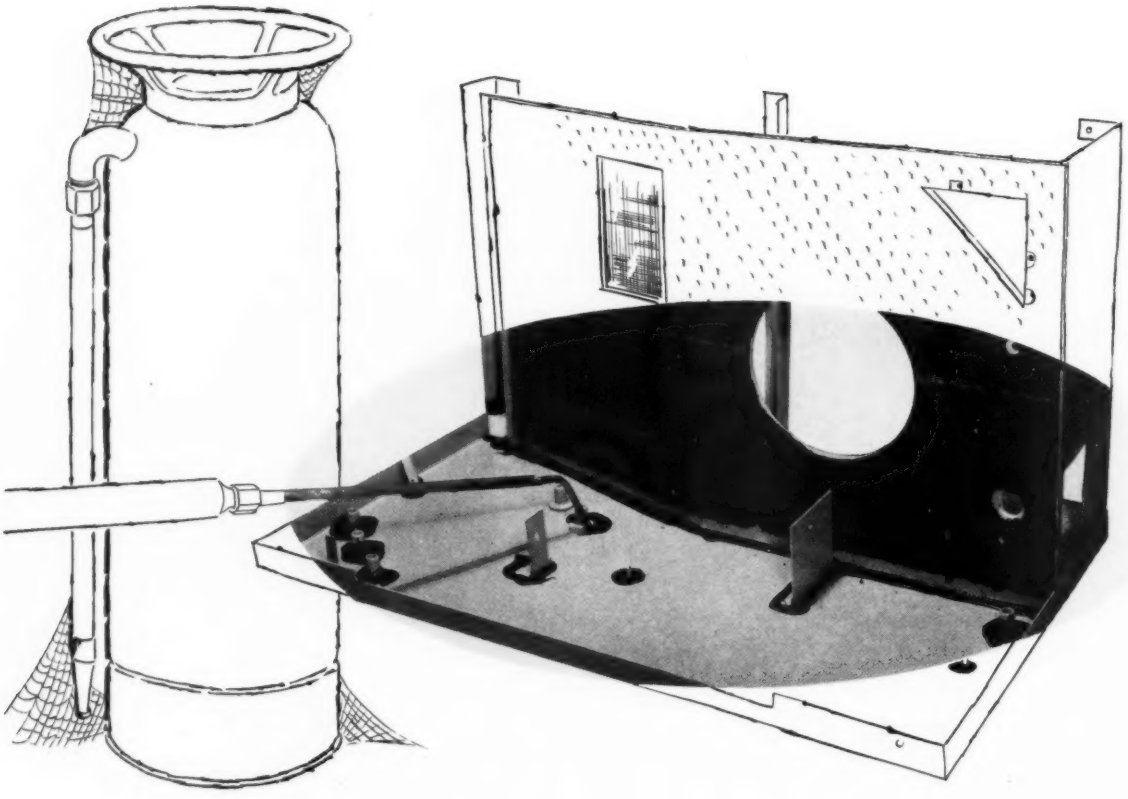
time you order, ask for P-K *Hi-thred*. You get this extra measure of holding power at no increase in cost! P-K *Hi-thred* tapping screws are available in production quantities in types A or Z in non-countersunk slotted or Phillips Recessed head styles. ■ Get samples and technical data from your nearby P-K "Bulk-Stocking" Distributor. Call him today!

PARKER-KALON DIVISION
General American Transportation Corporation, Clifton, New Jersey · Offices and warehouses in Chicago and Los Angeles.

YOU GET AN EXTRA MEASURE OF HOLDING POWER WITH THE NEW P-K® Hi-Thred*

*Pat. Pending

KEEP AMERICAN INDUSTRY AT WORK . . . P-K . . . MADE IN U.S.A.



seal with safety . . .

#144.7 Mastic is self-extinguishing!

This fire-safe mastic is an ideal air-conditioning sealer. Because it is self-extinguishing after the solvent has been released, and because it is pumpable, #144.7 is well suited to fast production-line applications. For example:

- Self-extinguishing sound deadener.
- Insulating and protecting bottom pan of room-type air conditioner against corrosion.
- Sealing air-directing partitions.
- Protecting projections, welded studs, annular areas, etc., from corrosion.
- Sealing to keep condensate and air where they belong.
- Holding sound deadening pads in place.
- Miscellaneous applications on dual-purpose air conditioning and heating equipment.

. . . AND DON'T FORGET THE OTHER #144-SERIES SEALERS

Whatever the sealing characteristic you need, there's probably a #144 Sealer to fill the bill: fast-drying or slow-drying; odorless; capable of retaining "life" under water; break-down resistance to frequent cycling; ability to span seams and gaps without slumping; to take paint baking temperatures without running out of place.

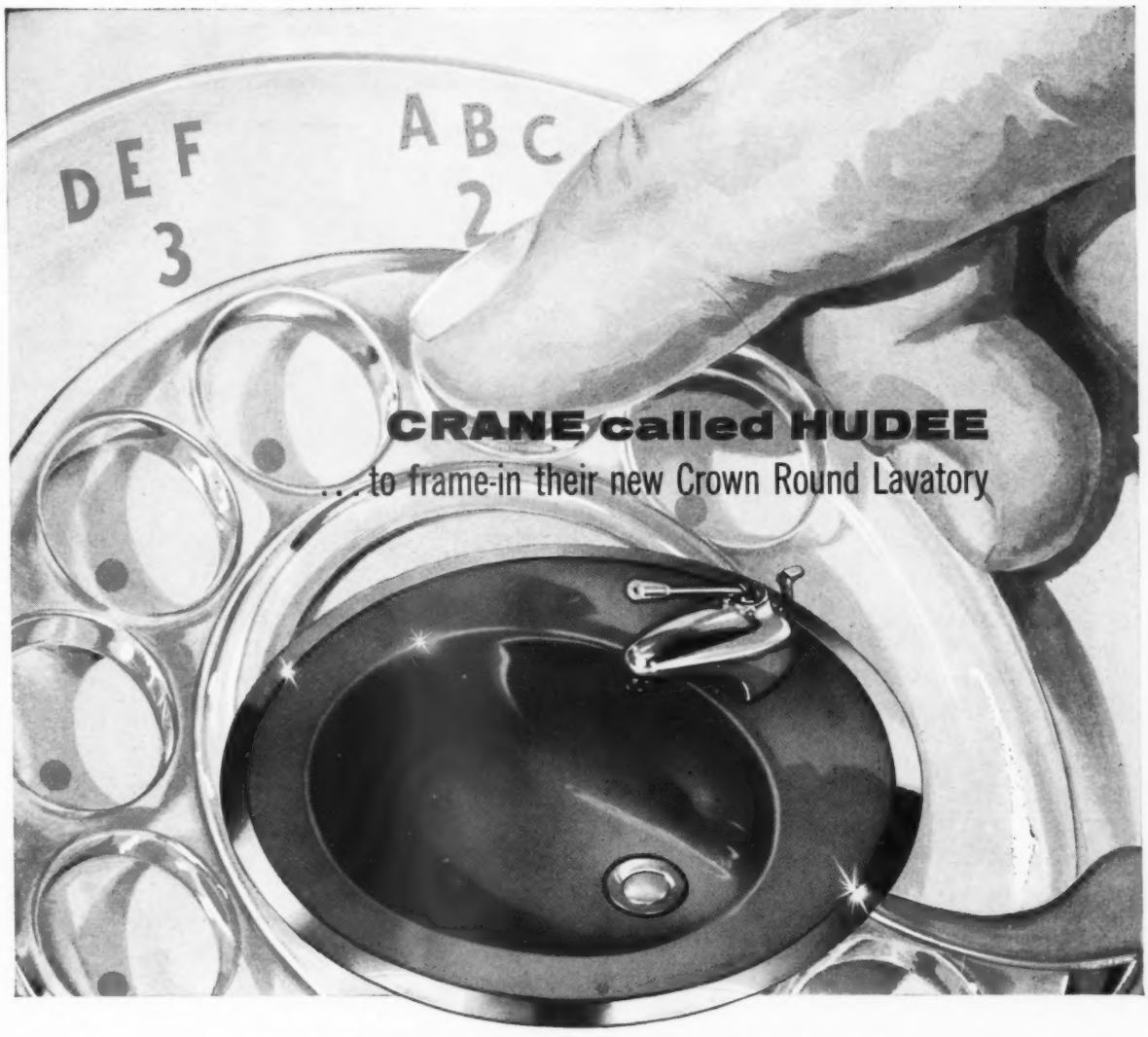
WANT A SAMPLE? Write Dept. R-6, describing your product needs.

PRESSTITE Sealing Compounds

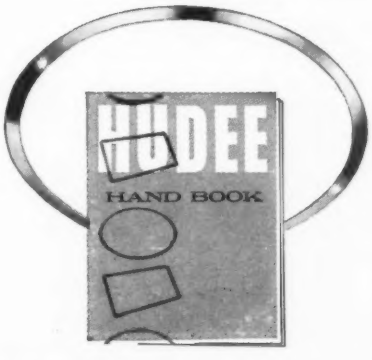
PRESSTITE-KEYSTONE ENGINEERING PRODUCTS COMPANY

K A P

A DIVISION OF AMERICAN-MARIETTA COMPANY • 3786 CHOUTEAU AVE. • ST. LOUIS 10, MO.



because Hudee Frames feature "Sealed-in Styling"



When leading fixture-makers create a new sink or lavatory, their plans include a Hudee Frame. They call for Hudee because they're sure of a frame *styled to seal in* . . . sure of a smart design that will complement their modern fixtures.

In the case of the Crane *Crown Round* Lavatory, a perfectly round rim was required to guarantee perfect installations and Hudee's creative engineering staff went to work . . . a new ingenious rim-forming machine was developed that would produce a round rim that seals water-tight every time.

Don't take chances. If you have a fixture-framing problem, call Hudee. Our rim experts will give you the most practical, satisfying answer.

get this valuable new handbook!

New Hudee Handbook—the only one of its kind—gives 50 reference tables showing which frame to order for each of the 1,062 sinks and lavatories in the industry, plus other pertinent information.

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225 West Hubbard Street, Chicago 10, Ill.
Hudee Frames are covered by patents 2,440,741 and 2,704,370

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Whether you're finish-coating products of any size or shape . . . applying adhesives, lubricants, glazes . . . or marking, stenciling, surface treating . . . it's time you investigated the DeVilbiss automatic spray method for your process.

With DeVilbiss automatic spray guns, you eliminate coating variations common to other methods; material use is constant; production rates uniform; and costs substantially reduced.

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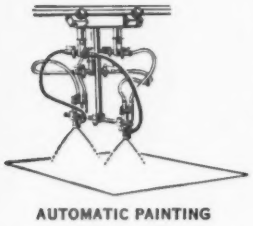

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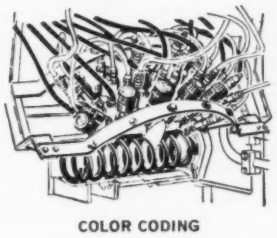
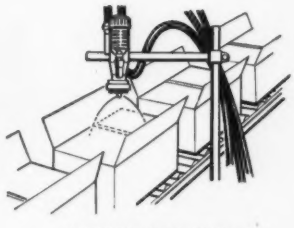
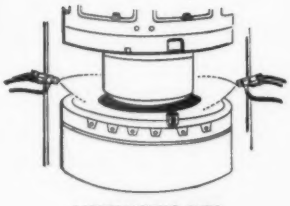


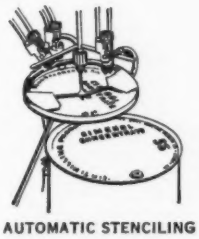
COLOR CODING



APPLYING ADHESIVES



LUBRICATING DIES



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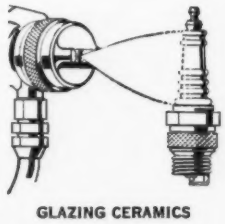

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Alkalume LC-1 is a specially developed immersion-type cleaner for removal of buffing compounds and soil from all metals, prior to plating or anodizing.

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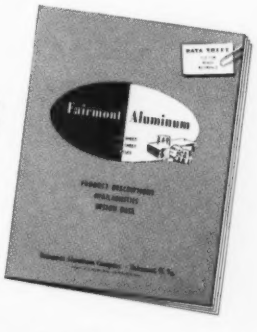

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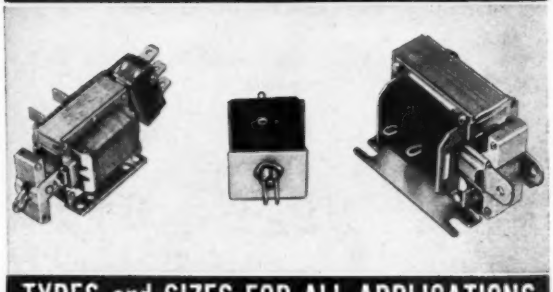

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MPM Suggestion Box

Hamilton acquires sales rights to pack file system

THE HAMILTON PACK INTERLOCK Filing System, including the complete line of Roll Drawing Files and all accessory equipment, is shown in the accompanying illustrations.

The Pack Interlock Filing System offers a systematic and economical method of filing valuable engineering roll tracings, project drawings, and groups of inactive and semi-active documents. Benefits include simplified classification, maximum protection, and greater filing capacity due to use of normal "dead" storage space.

The system consists of individual 2½ inch square containers, easily dovetailed together to form any size or shape stack required. The inner tubular receptacles accommodate drawings up to 2¾ inches in diameter, and are available in six lengths ranging from 22 to 54 inches.

Key pins drop into keyways that are machined into the interlocking dovetails. These key pins rigidly lock Inter-Lock File units to the stack, and make stacks of files into a solid unit. Cone-shaped openings make it easy to take hold of drawings. Slide index cards on front of containers lend themselves to color coding and out-markers.

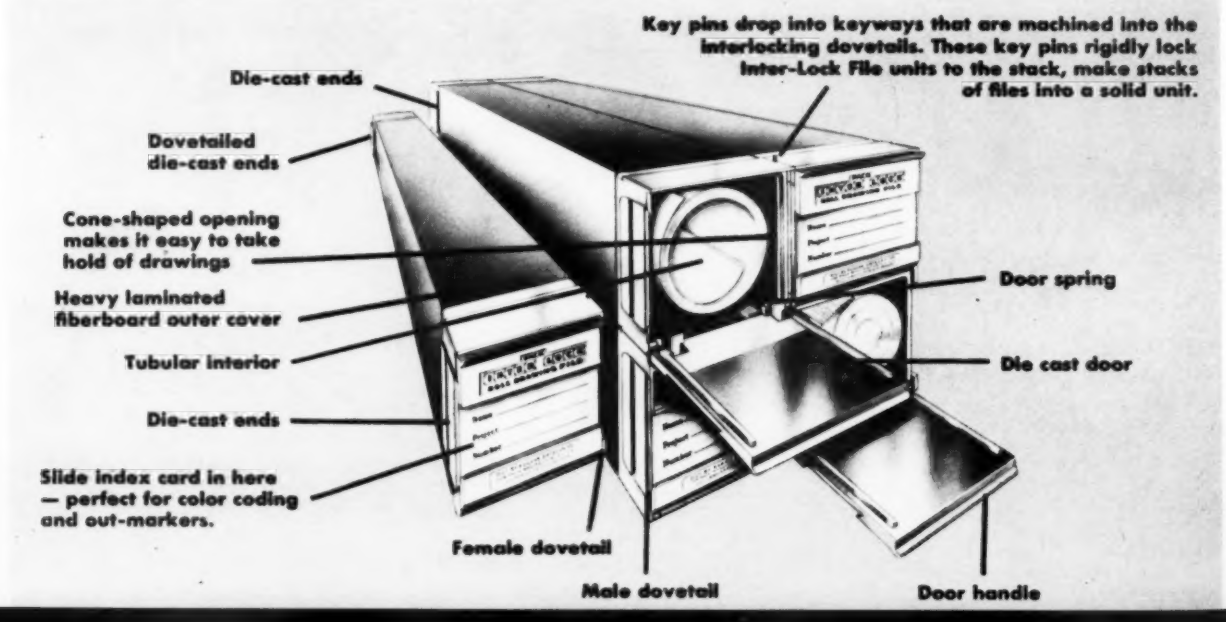
Compatible with any existing filing arrangement, Hamilton Pack files can be stacked from floor to ceiling, around pipes or ducts, under tables, or in virtually any available space. Files can be added one or more units at a time, making it possible to tailor purchases directly to current storage needs.

Metal snap-on plates may be added to side and top surfaces, encasing the entire stack. Each compartment is heavily insulated from the others, providing resistance to fire, dust, light, moisture, and vermin.

Distribution of the new product line will be made through Hamilton's national network of drafting equipment dealers.

For further information, contact the Special Projects Editor, METAL PRODUCTS MANUFACTURING.

Hamilton Pack Interlock files fit around existing files, and can be extended up to the ceiling to fit any available space. Photo shows file room of Northrop Aircraft, Inc., Hawthorne, California.


Key pins drop into keyways that are machined into the interlocking dovetails. These key pins rigidly lock Inter-Lock File units to the stack, make stacks of files into a solid unit.
Die-cast ends
Dovetailed die-cast ends
Cone-shaped opening makes it easy to take hold of drawings
Heavy laminated fiberboard outer cover
Tubular interior
Die-cast ends
Slide index card in here — perfect for color coding and out-markers.
Door spring
Die cast door
Female dovetail
Male dovetail
Door handle

New product beauty and uniform coverage with CORVEL† vinyl "fusion bond" finishes

unretouched photos

Excellent coverage of edges, corners and projections—

finishes unmarred by sags, drips or bridging

CORVEL vinyl finishes are specially processed dry powders, formulated for use in the patented* fluidized bed coating process. These finishes give you the following outstanding advantages:

- Heavy finishes (approx. 0.010″ to 0.032″) obtained by a single dip—without solvents.
- Wire intersections and joints are thoroughly covered, have clean, neat appearance.
- Wire section coating has good concentricity.
- Surface has outstanding color and gloss retention, extreme toughness, excellent resistance to corrosion and chemicals.

Thus, CORVEL finishes can give your products improved durability and appearance at minimum cost.

Process licensing is now readily available. A process license is automatically extended to the purchaser of CORVEL powders from National Polymer Products, Inc. upon payment of a small royalty added to each sales invoice. General licenses to use the patented process can be obtained from Polymer Processes, Inc. an affiliate company.

Investigate the advantages of CORVEL vinyl finishes. Details on the fluidized bed process and equipment are available. Other CORVEL finishes include cellulosics, epoxies, nylon, polyethylene, and chlorinated polyethers.

Write today for a copy of the new CORVEL Bulletin.

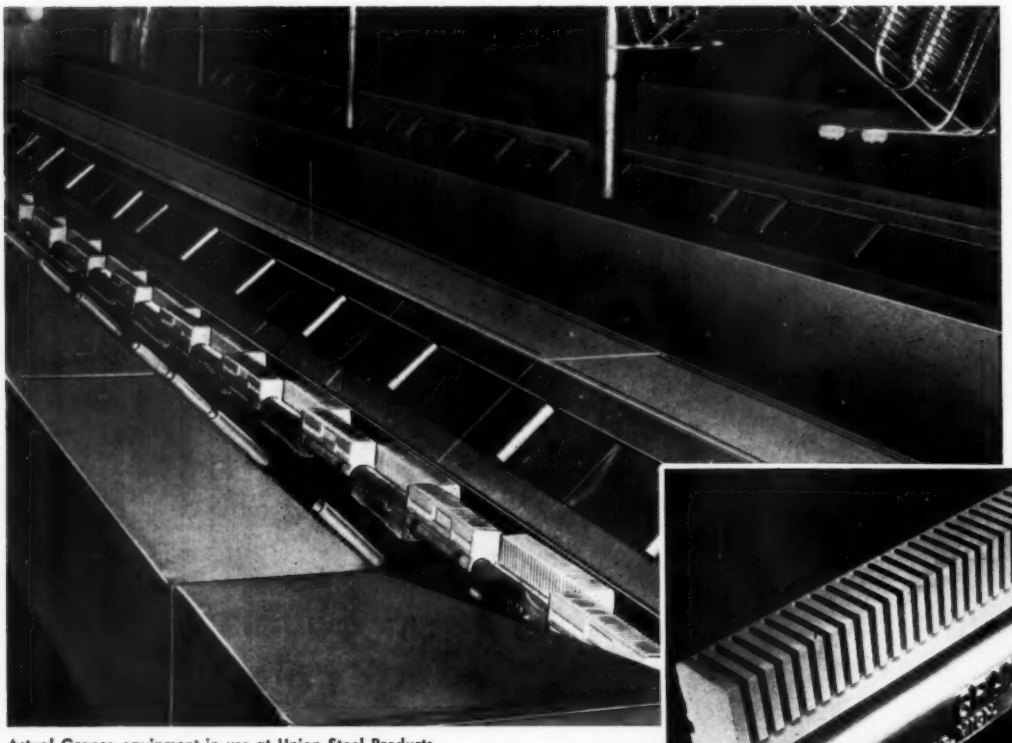
NATIONAL POLYMER PRODUCTS, INC. / Reading, Pennsylvania

West Coast facilities: The Polymer Corporation, Santa Ana, California

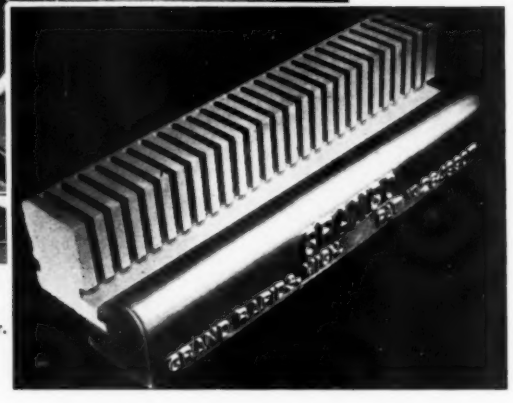
†Polymer Corporation trademark for finishing materials

*U.S. Patent 2,844,489 and over 30 patents pending

POLYPENCO*



Actual Granco equipment in use at Union Steel Products.



Original patented irradiant grid flameless gas burner.

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Furnaces

Spray booths

Parts washers

Flo Coat systems

Oven air heaters

Bonderite systems

Air supply systems

Complete finishing systems

Flameless gas burner systems

This is the fourth **Granco** installation engineered for Union Steel Products Co., Albion, Michigan, manufacturer of quality wire products. The oven is an infrared type installation, employing the **Granco Irradiant Grid** flameless gas burning system. Installed above roof level, it provides a combined radiant-convection bake for synthetic coatings, in a dust-free atmosphere.

Every company has its own requirements when it comes to finishing systems. **Granco** is equipped to engineer the complete installation to best meet finish, production, speed, and space requirements.

Call us during your early planning stage and you will find our personalized service helpful in consulting with your engineers and production men.

Granco ovens do the job better and, in most cases, at lower cost.

(Write for brochure)

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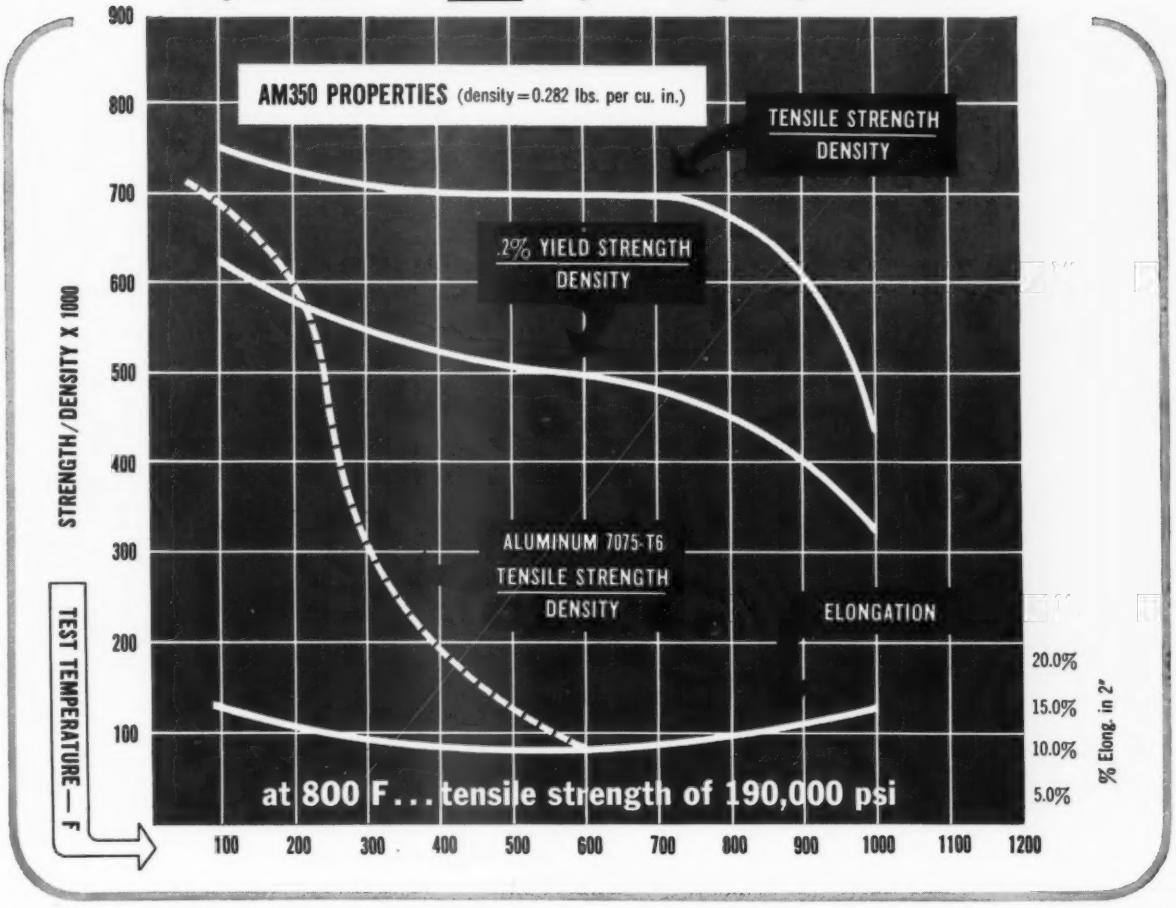
Experience**—the extra alloy in **Allegheny Stainless



Here are the facts on AM350 and AM355, Allegheny Ludlum's precipitation hardening stainless steels

A unique combination of highly desirable properties is the usual description of Allegheny Stainless AM350 and AM355 Steels. They combine high strength at both room and elevated temperatures, excellent corrosion resistance, ease of fabrication, low temperature heat treatment, good resistance to stress corrosion.

They are proving the answer to many problems of the air age. Airframe and other structural parts, pressure tanks, power plant components, high pressure ducting, etc. are all natural missile and supersonic aircraft applications for AM350 and AM355.

Availability: AM350, introduced several years ago, is available commercially in sheet, strip, foil, small bars and wire. AM355, best suited for heavier sections, is available in forgings, forging billets, plate, bar and wire.

Corrosion resistant: Being stainless steels, these alloys resist corrosion and oxidation. Compared to the older, more familiar stainless grades, their corrosion rating is better than the hardenable grades (chromium martensitic) but generally less than the old corrosion resistant standbys, the 18 and 8's. Stress corrosion is resisted at much higher hardness levels than with martensitic stainless.

Simple heat treatment: High strength is developed by two methods, both involving less than ordinary temperatures and minimizing oxidation and distortion problems. The most popular, and one that develops slightly better properties, is the Allegheny Ludlum developed sub-zero cooling and tempering (SCT condition). The material is held at minus 100 F for 3 hrs plus 3 hrs at 850 F. Alternate method is Double Aged (DA): 2 hrs at 1375 F plus 2 hrs at 850 F.

Easy fabrication: AM350 and AM355 can be spun, drawn, formed, machined and welded using similar procedures as with the 18-8 stainless types. In the hardened condition (SCT & DA) some forming may be done . . . 180 degree bend over a 3T radius pin. Also it can be dimpled in the hard condition to insure accurate fit-up.

For further information, see your A-L sales engineer or write for the booklet "Engineering Properties, AM350 and AM355." ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.*** Address Dept.MG-15

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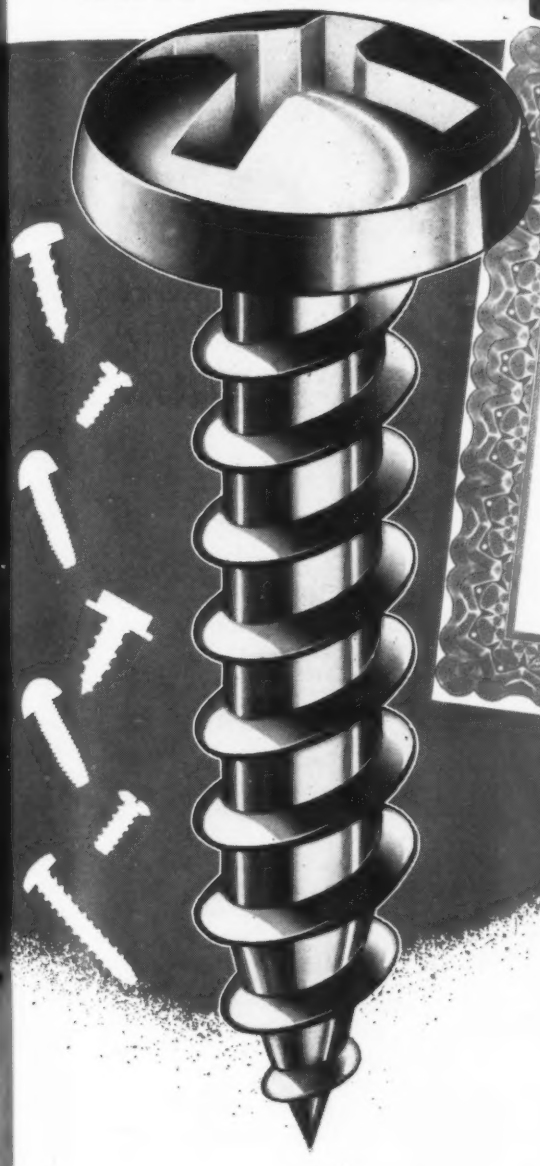
(CLYDE DIVISION)



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December 15, 1958

All of us here at Universal are proud of the "Supplier of the Month" award from Whirlpool Corporation, Clyde Division, particularly because it comes from a company so highly respected in the home appliance field. While all companies do not give such awards, all are equally interested in high quality products and components from their suppliers. Because pride of workmanship has always been the dominant philosophy at Universal, it has been possible for us to produce award-winning-quality screws for users in many fields. If you're not a Universal customer there's no better time than now to become one, and gain all the advantages that Universal customers enjoy.

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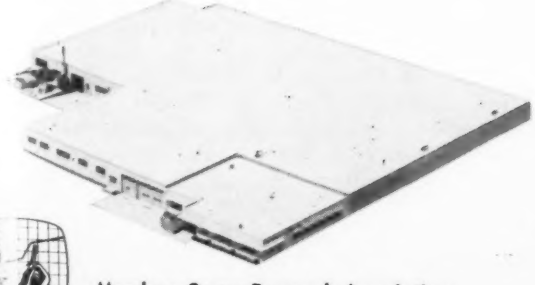

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Use stainless steel to obtain greater freedom of design. Its extremely high strength-to-weight ratio permits the use of thinner, lighter sections to reduce weight and bulk.

Use stainless for trim and brightwork. It has the strength to withstand the abuse of everyday use. It provides maximum resistance to denting and scratching.

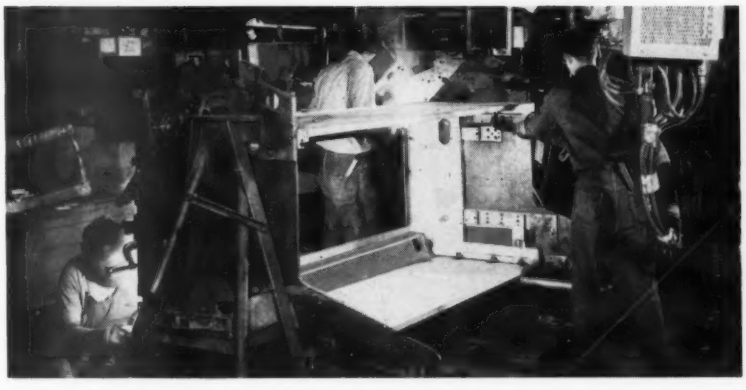
Use stainless for functional parts. Strength, heat-resistance, and corrosion-resistance make it the perfect metal for any application involving heat or cold.

Use Republic ENDURO® Stainless Steel to give your product more sales appeal. Republic metallurgists and engineers will assist you in selection, application, and processing of ENDURO Stainless Steel. No obligation for their services, just mail the coupon. Or contact your Republic ENDURO Stainless Steel Distributor—your steel service center—for more information.

TO YOUR FABRICATED SHEET STEEL PRODUCTS add the specialized services of Republic Berger Division's contract manufacturing facilities and equipment. Berger's large stock of standard tools, dies, and specialized equipment for punching, shearing, forming, welding, and Bonderizing are available to you. Constant research and development at Berger have resulted in advanced processes and techniques to make your fabricated sheet steel products more attractive, and more economical. Bulletin 1090 will show you what Berger specialized services can do for you.

TO THE PROPER QUALITY OF REPUBLIC MANUFACTURERS' COARSE WIRE add the services of Republic Wire Metallurgists. These wire experts are always available to assist you in selection, application, and processing. They investigate the desired end use—the problems of quality, yet low-cost, quantity production—then suggest a specification to do the job. Republic produces Manufacturers' Coarse Wire to meet almost every production need. Large tonnages are shipped to appliance manufacturers for plated shelves, racks, grilles, and numerous other products. Write today for more information.

TO PROPER DESIGN AND MATERIAL SELECTION of Tyler Refrigeration Corporation food sales-cases add the strength, corrosion-resistance, and economy of Republic Galvannealed Sheets. Tyler has found these sheets ideal for inner and outer walls of their units in meeting requirements for strength, corrosion-resistance, and good ductility, as well as providing initial and long-term economy. Galvannealed's tight, uniform zinc coating, spangle-free, will take all ordinary forming operations. Shear, blank, pierce, form, flange, solder, deep draw, bead it with ease. Mail coupon for full facts.



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Bonding vi

Here, the vinyl film is brought into contact with the adhesive-coated steel by the rubber covered pinch rolls shown at right. The operator has complete control over the pressure of the rolls. When the end of a sheet is reached, pressure is released until the next sheet reaches the rolls. A pressure of 80 pounds is exerted to bond the sheets together. When the end of an order or type of vinyl film reaches the bonding machine, it is stopped and another type or color vinyl film is threaded into the rolls in approximately two minutes time.

EXCLUSIVE MPM PHOTOS

how vinyl sheet is laminated to metal and later formed wi

MPM EXCLUSIVE FEATURE

Laminated vinyl-to-metal sheet, properly processed, can be formed on conventional dies to a wide variety of shapes. Furthermore, it possesses amazing resistance to heat, abrasion, and corrosion. Vinyl-clad metal sheets are presently used for such products as TV cabinets, automotive interior trim, metal furniture, and luggage.

Shwayder Brothers, Inc., known for their "Samsonite" luggage and metal furniture, bonds vinyl to metal for their own metal furniture line, and produces it for other manufacturers on a contract basis at Detroit, Mich. This company, along with their Denver plant, has pioneered forming vinyl-clad sheet on standard presses with the same dies that are used for raw metal. The bottom edges are curled under in the same type forming operation that is used for uncoated metal. This was a very important development, for it enabled an automobile manufacturer to form interior moldings and panels on conventional dies.

High durability

Vinyl-clad table tops manufactured by the company have been salt spray tested by an independent organization, according to ASTM Test Designation B117-54T. Results of this test showed no creepage of the vinyl after 480 hours. After 1,008 hours in a standard humidity test, no blistering could be detected on vinyl laminated seats and panels.

ing vinyl to metal at 20 feet per minute

AN MPM STAFF FEATURE

Exit end of the five-stage metal preparation machine. Both sides of the sheets receive spray-applied cleaning, phosphatizing, and subsequent rinsing treatments. The sheets are dried at 270° F. in a gas-fired oven just before passing through the rubber covered squeegee rolls visible at center left. These rolls remove the last traces of rinse from the sheets.

In another test of durability, nearly a hundred lighted cigarettes were placed directly on a vinyl-clad table top and allowed to burn completely. No damage could be detected after repeated tests of this kind.

It is almost impossible to damage the vinyl cover with a sharp instrument or knife. This was graphically demonstrated to MPM editors while visiting the plant.

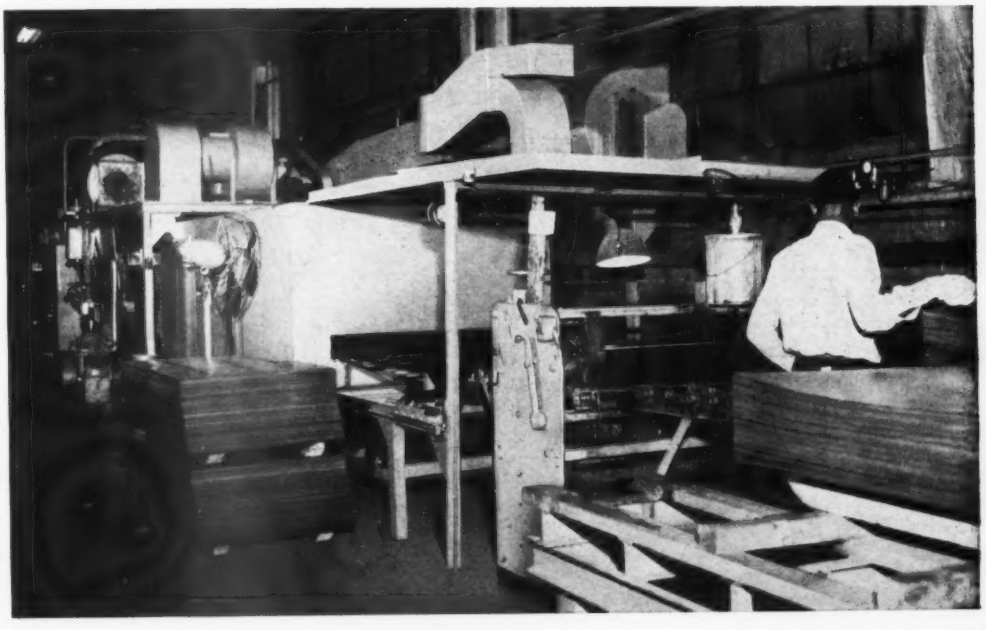
A standard quality control test made along the laminating line demonstrates durability. It consists of cutting a corner of the completed sheet, scoring a cross mark on the vinyl side with a knife, and drawing the metal at the cut section to the fracture point in a hydraulic press with a one-inch steel ball. Should the vinyl peel loose from the metal at the cut section, the sample is rejected and adjustments are made in processing before more stock is made. This test is made on every sheet to maintain required quality.

Stock must be clean

In addition, and prior to cleaning steel by sprayed-on cleaning solutions, the side that is to be coated with vinyl is cleaned mechanically with steel wool. It is done with a large floor polisher in a trough near the feed end of the line. The trough is used to allow a mild cleaning solution to drain off over the sheet while it is scoured with the steel wool. It is not necessary to clean aluminum mechanically prior to entering the spray cleaning cycle.

Briefly, the bonding line consists of a cleaning and phosphatizing machine, a roll coater to apply the adhesive, a

ed wi nventional draw dies



Feed end of the bonding operation. Just to the left of the operator, who is feeding sheets into the machine, is the roll coater for applying the special adhesive. The same line is used to paint the reverse side of the sheet used for table tops and chairs.

gas-fired oven, and a machine for bonding the vinyl to the metal. Sheets as wide as 49 inches can be processed through the equipment. A production rate of 20 feet per minute is normally maintained. This is the equivalent of approximately 400 32-inch square table tops an hour.

The requirement for cleanliness is satisfied when, before the sheets enter the adhesive coater, a cleansing tissue comes up clean after being wiped on the sheet. Each sheet is checked in this manner to insure good bonding.

Five-stage metal preparation

The sheets are loaded manually on a conveyor at the feed end of the 60-foot long, five-stage metal preparation machine. All solutions and rinses are applied by spray nozzles located above and below the conveyor. The first stage is an alkali cleaner at 165° F. that removes the oil and dirt, and the second stage is a mild solution of detergent at 160° F. This is a more effective method of rinsing the cleaner solution from the sheet than a plain water rinse.

In the third stage, the metal is sprayed with a phosphatizing solution. This stage, which is maintained at 165° F., is very much the same as phosphatizing done prior to painting.

For aluminum sheet, the process is similar, except that a solution meant for aluminum is used to roughen the bonding surface of the sheet.

Following the third stage, a neutralizing rinse at 165° F. is applied, and the fifth stage consists of a chromic acid solution which acts as a surface preservative. The sheet is then dried in an oven at 260° F.

When the prepared sheets emerge, they are stacked for cooling and also checked with cleansing tissue prior to being fed into the adhesive coating machine.

Roll coater applies adhesive and paint

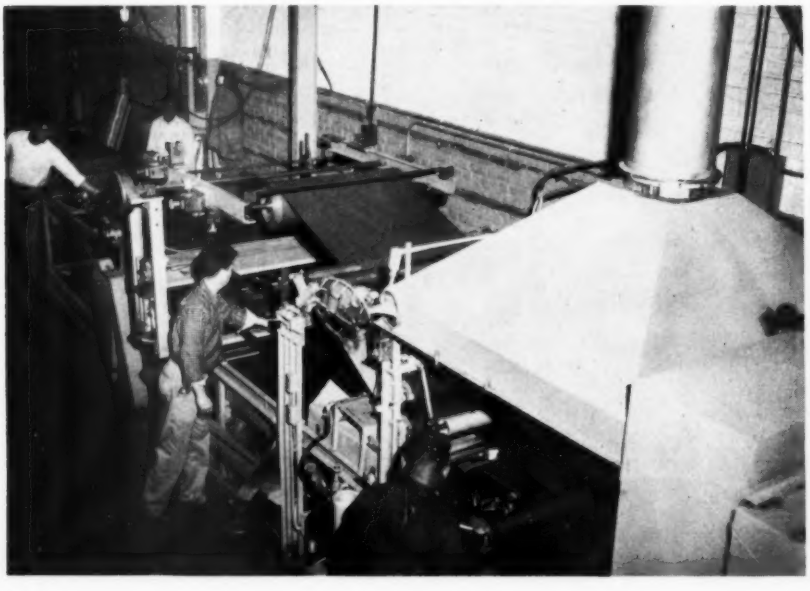
A roll coating machine automatically applies the special adhesive to the top side of the sheet. This same machine and rolls are used later to apply paint to the bottom of the sheet after vinyl is bonded to the metal. Thickness of the adhesive is controlled to approximately

to Page 62 →

Coating the corners of the underside of the vinyl-clad steel before drawing.

Removing the blanked and drawn table top from the first press.

An overall view of the laminating machine from the bonding end. The operator at center is visually inspecting the surface for any possible defects.



Removing the table top from the press after bottom edges have been pre-curled.

Fabrication of the stainless steels

by Lester F. Spencer • CONSULTANT

workability, forming, and welding properties correlated with the various types of stainless steel

PART ONE

MPM EXCLUSIVE FEATURE

THE STAINLESS STEELS cover a wide range of chemical compositions, within which may be found an analysis for almost every application. Their inherent resistance to both a scaling atmosphere and a corrosive media is well known, the extent of resistance offered by these analyses being in proportion to the alloying content within the composition. In addition, the stainless steels are noted for their long-lasting lustrous appearance, high fatigue and tensile strength, and excellent ductility at both high and low temperatures.

The element chromium is the contributing factor in obtaining corrosion resistance, the specific function being the formation of a thin, transparent protective oxide film that will prevent further attack. With a chromium content of about 12.0 per cent, normal atmospheric conditions are sufficiently oxidizing to promote the formation of this oxide film. However, as the oxidizing conditions of a corrodant become less and less, successive higher chromium contents within an analysis are required to promote the formation of this protective film.

The addition of nickel to an analysis, as exemplified in the austenitic stainless steels, serves a dual purpose in that it improves the stability of the protective film and aids in its formation. There are also other types of alloys that are added for specific purposes, among which would be the use of either titanium or columbium to prevent the formation of intergranular carbides, molybdenum to increase the corrosion resistance to certain media such as sulfuric and sulfurous acid, sulfur and selenium to improve machining characteristics and to reduce seizing, and silicon to obtain an increase in oxidation resistance.

Resistance to scaling is dependent upon the formation of a tightly-adherent refractory oxide, the upper temperature limit being governed by the chromium content within the base analysis. Thus, an analysis containing from 12 to 14 per cent chromium is usually satisfactory for temperatures up to 1,400° F.; one that has about 18.0 per cent chromium will raise this temperature to 1,600° F.; and, with an increase in chromium to about 28.0 per cent, the upper limit in resistance to scaling is at 2,000° F. The addition of nickel to heat-resistant stainless alloys will realize a retention of toughness at elevated temperatures, a property that is lacking in the straight chromium analyses.

Types of stainless steel

Since the stainless steels are considered special alloys, their reaction during fabrication will differ from the methods used for the carbon steels. There are three basic groups, with the method of handling any single group of alloys, as exemplified by the ferritic stainless steels, being similar; however, where two basic groups are considered, such as the ferritic and the austenitic types, the method for forming or resistance welding will differ for each

Table 2 — Hardness Range of Various Tempers on Three Widely-Used Stainless Steels

Temper Designation	Approximate Rockwell Hardness		
	Type 301	Type 302	Type 430
Dead Soft	B75 to B80	B75 to B80	B75 to B80
Soft	B80 to B85	B80 to B85	B80 to B85
¼ Hard	B100 to C25	B100 to C25	B90 to B100
½ Hard	C25 to C35	C25 to C35	C15
¾ Hard	C35 to C40	C35 to C40	C20
Full Hard	C40 and over	C40 and over	C25

Table 3 — Bend-Test Requirements — Austenitic Stainless Sheet and Strip

Temper	0.030 inches and less in thickness		0.031 to 0.050 inches thick		0.051 inches and over in thickness	
	Angle, deg.	N*	Angle, deg.	N*	Angle, deg.	N*
¼ Hard	180	1	180	1	90	2
½ Hard	180	2	180	4	90	2
¾ Hard	180	4	90	2½	—	-
Full Hard	180	6	90	3½	—	-

Note: — The bend test specimen shall withstand being bent cold through the angle specified without cracking on the outside of the bent portion. The radius of bend shall be equal to "N" times the thickness of the specimen. One test specimen is usually prescribed for both the longitudinal and transverse direction. (ASTM Specification A177-44)

grouping. These group differences will be stressed in the article when applicable. To familiarize the reader, the identifying characteristics are given.

(1) The AUSTENITIC stainless steels have both chromium and nickel as the major alloying elements (300 series, Table 1). Although they cannot be hardened by conventional heat treatment, a wide variety of physical properties can be obtained by cold work. They are non-magnetic; however, after cold working they may become slightly magnetic. In the annealed condition, these alloys are much tougher and more ductile than ordinary steel.

(2) The FERRITIC stainless compositions contain more than 14.0 per cent chromium as the major alloying element. These alloys are always magnetic and, like the austenitic group, they cannot be heat treated in the conventional manner. Included in this group are types AISI 430, 442, and 446 (Table 1). These alloys are relatively strong and ductile when in the annealed condition, exhibiting maximum corrosion resistance in this condition.

(3) The MARTENSITIC alloys contain less than 19.0 per cent chromium. They can be heat treated to a variety of mechanical properties, and full corrosion is not realized until the composition has been heat treated. They are always magnetic, and would include the AISI 400 series excluding those listed for the ferritic steels.

The stainless steels in strip form are available in a variety of hardness levels, which would range from the relatively-ductile, fully-annealed strip to materials that are re-rolled to produce tempers ranging from ¼ to full hard. As is indicated in Table 2, the hardness progressively increases as the temper increases which will result in a corresponding decrease of ductility and a subsequent limitation as to formability. The bend test requirements for these various tempers in accordance to the thickness of the material is given in Table 3. Commercially, the strip finishes that are available are:—

(1) No. 1 finish is an annealed and pickled strip that is employed where the forming operation requires the maximum ductility.

(2) No 2 finish is an annealed, pickled and re-rolled strip; this operation will realize the available tempers.

Workability of the stainless steels

The austenitic alloys (AISI 300 series) have the greatest potential as to formability as compared to either the ferritic or the martensitic groups. A few comments as to the relative formability of

to Page 32 →

Table 1 — Composition, Description and Typical Applications of the Stainless Steels.

COURTESY CRUCIBLE STEEL CO. OF AMERICA

AISI Type	% C	% Mn. Max.	% Si	% Cr	% Ni	% Other Elements	Description & Typical Applications
302	over 0.08 / 0.20	2.0	1.0 Max.	17.0 / 19.0	8.0 / 10.0	—	Non-hardenable austenitic stainless; general purpose corrosion resisting steel. USES – architectural trim, chemical, dairy & milk handling equipment, kitchen ware, restaurant, bar & fountain equipment, nails, wire mesh, jewelry, springs & spring wire, aircraft engine cowlings & fire walls, auto aerials and antennas.
302B	over 0.08 / 0.20	2.0	2.0 / 3.0	17.0 / 19.0	8.0 / 10.0	—	Superior resistance to scaling at elevated temperatures. USES – air preheaters, furnace parts, range oil burner shells, still liners.
303	0.15 Max.	2.0	1.0 Max.	17.0 / 19.0	8.0 / 10.0	Mo – 0.6 Max. S – .07 Min.	Improved machining & non-galling properties. A selenium modification has slightly higher transverse properties and slightly lower machinability. USES – screw machine parts, machined shafts, bar & fountain accessories, homogenizers, fishing guides, valves & accessories for chemical handling equipment.
304	0.08 Max.	2.0	1.0 Max.	18.0 / 20.0	8.0 / 11.0	—	General purpose, corrosion resistant austenitic stainless. USES – chemical handling equipment, kitchenware, recording wire, hatch covers, door bars and kick plates, coffee urns, soda fountain equipment, textile dyeing equipment.
309	0.20 Max.	2.0	1.0 Max.	22.0 / 24.0	12.0 / 15.0	—	High heat resisting properties. USES – air preheat baffles, aircraft heaters, annealing covers, automatic heat treating equipment, sulphite liquor handling equipment.
309B	0.20 Max.	2.0	2.0 / 3.0	22.0 / 24.0	12.0 / 15.0	—	Excellent heat resistance. USES – air preheat baffles, automatic heat treating equipment, sulphite liquor handling equipment.
310	0.25 Max.	2.0	1.5 Max.	24.0 / 26.0	19.0 / 22.0	—	Excellent heat resistance. USES – heat exchangers, furnace doors, belts and retorts, heat treating trays, boxes & tubes, gas turbine & aircraft engine exhaust systems, furnace conveyor belts, hydrogenation tubes & equipment.
311	0.25 Max.	2.0	2.0 / 3.0	18.0 / 20.0	24.0 / 26.0	—	Excellent heat resistance. USES – heat treating equipment, furnace stokers, boiler plant equipment, annealing boxes.
314	0.25 Max.	2.0	1.5 / 3.0	23.0 / 26.0	19.0 / 22.0	—	Best heat resisting steel for general purposes. USES – about the same as type 310.
316	0.10 Max.	2.0	1.0 Max.	16.0 / 18.0	10.0 / 14.0	Mo – 2.0 / 3.0	Excellent corrosion & heat resistance. USES – high temperature chemical handling equipment, photographic developing equipment, steam jacketed kettles, food processing equipment, storage tanks, pulp handling equipment.
321	0.08 Max.	2.0	1.0 Max.	17.0 / 19.0	8.0 / 11.0	Ti – 5 x C Minimum	Prevention of intergranular carbides; particularly useful for service between 800 & 1600°F. USES – aircraft engine exhaust manifolds, boiler shells, collector rings, expansion joints, high temperature chemical handling equipment.
325	0.30 / 0.50	2.0	1.00 / 1.75	7.0 / 10.0	19.0 / 23.0	Cu – 1.0 / 1.5	Superior corrosion resisting properties for specific uses. USES – crude oil pump shafts & parts, mine water pump shafts.

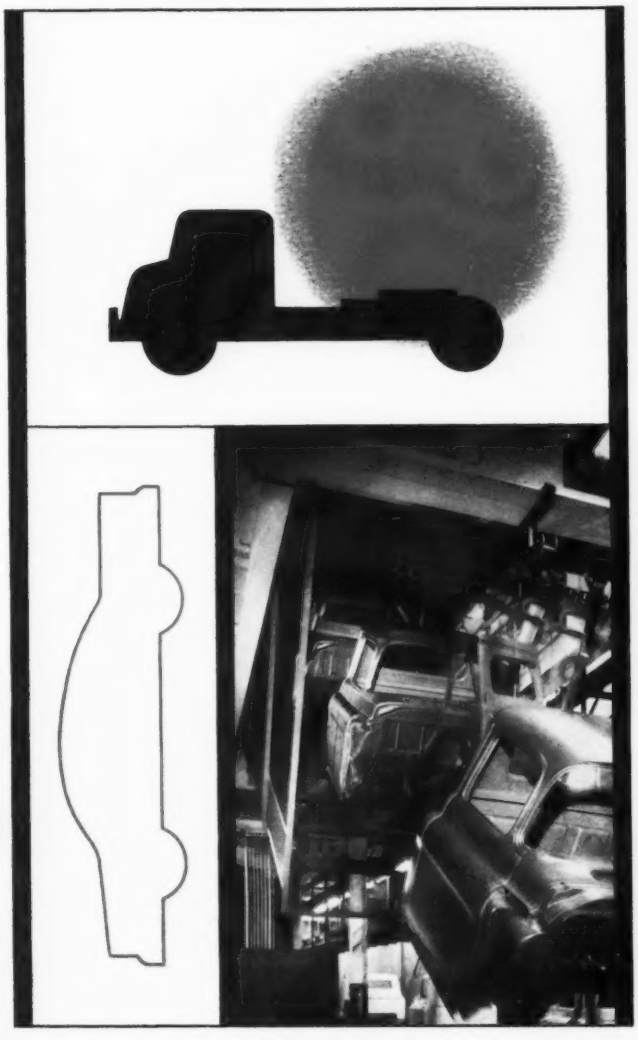
PROCESS

Finishing one of America's most popular lines of low-priced cars and trucks

PRODUCT

Nine new Despatch finish bake ovens

DESPATCH



One of America's major automobile manufacturers has just installed nine huge new Despatch finish-paint bake ovens at one of its division plants. These ovens bake both the prime and finish coats on the cars and trucks. And they process many different kinds of paint. The operating temperatures range from 200°F to 400°F, controlled to tolerances of ±5°F.

Eight ovens are exterior units located on the roof of the plant; one is located inside.

Two prime ovens have catalytic combustion units that burn solvents released from the painted parts. This results in increased efficiency and decreased atmospheric contamination.

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the more frequently encountered compositions are given thus:—(a) type 302 is widely used for deep drawing and spinning operations; the low rate of work hardening will permit reductions up to 45 per cent before an anneal is required; (b) type 302B has good formability; the silicon content increases resistance to scaling; (c) type 304 has similar forming characteristics when compared to type 302; however, due to its lower carbon limit, it can be used to weld semi-critical items where a minimum of harmful carbides are required. These intergranular carbides, when present as a network, will dramatically decrease corrosion resistance and thus should be avoided; (d) type 305 is reputed to be an ideal analysis for spinning; the very low rate of work hardening will permit reductions up to 70 per cent; and (e) types 321 and 347 have less formability; however, it is an ideal analyses where welded structures have to be completely free of harmful carbides.

The martensitic stainless have sufficient carbon content within the analysis to realize greater difficulty in working. However, fully-annealed material can be used for simple operations where very little reduction takes place. The more common alloy used in this group is type 410.

The ferritic alloy type 430 has a ductility that is about 50 per cent of that exhibited by type 302; however, with proper planning of reductions and softening anneals, surprisingly-large reductions are possible. This steel has a tendency toward directional properties, and is more sensitive to breaking in longitudinal lock seaming and bending operations. They may also exhibit stretcher strains when dead soft, which may be controlled to some extent by light temper rolling. This steel is not subject to age hardening. Since type 430 does not work harden as severely as type 302, it is not as susceptible to stress cracking after a severe forming operation. This analysis is the most frequently used within the ferritic grouping.

Forming the stainless steels

The four major characteristics of the stainless compositions that will influence the procedures for forming these materials would include:

(1) The stainless steels, even in the dead soft condition, are 50 per cent stronger when compared to the carbon steels. This means that greater power is required to press-draw identical shapes.

(2) The austenitic stainless compositions will work harden about twice as

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AISI Type	% C	% Min. Max.	% Si	% Cr	% Ni	% Other Elements	Description & Typical Applications
347	0.08 Max.	2.0	1.0 Max.	17.0 / 19.0	9.0 / 12.0	Cb – 10 x C Minimum	Same function as type 321. USES – same applications as stated for type 321.
403	0.15 Max.	1.0	0.5 Max.	11.5 / 13.0	—	—	Selective high quality martensitic steel. USES – highly-stressed parts, steam turbine blades & parts, gas turbine & jet engine parts.
410	0.15 Max.	1.0	1.0 Max.	11.5 / 13.0	—	—	General purpose, corrosion & heat resistant martensitic stainless. USES – coal screens & chutes, low priced cutlery, machine parts, meat hooks, pump shafts & parts, sucker rods, oil refinery equipment.
414	0.15 Max.	1.0	1.0 Max.	11.5 / 13.0	1.25 / 2.50	—	Good corrosion and moderate heat resistance. Martensitic type. USES – rules & straight edges, mild springs, scraper knives.
416	0.15 Max.	1.25	1.0 Max.	12.0 / 14.0	—	Mo – .6 Max. S – 0.07 Min.	Martensitic type with improved machining & non-galling characteristics. Selenium bearing modification has slightly higher transverse properties and slightly lower machinability. USES – bolts, nuts, screws, carburetor parts, fishing reels, golf club heads, instrument parts, valve trim, automatic screw machine products.
420	over 0.15	1.0	1.0 Max.	12.0 / 14.0	—	—	General purpose martensitic cutlery grade. USES – dental & surgical instruments, bushings, cutlery, screw drivers, plastic & glass molds, valve trim.
430	0.12 Max.	1.0	1.0 Max.	14.0 / 18.0	—	—	General corrosion & heat resistant ferritic stainless. USES – decorative trim, oil ring burners, annealing boxes for brass, nitric acid storage tanks & tank cars, window anchor bolts.
430F	0.12 Max.	1.0	1.0 Max.	14.0 / 18.0	—	—	Ferritic type with improved machining & non-galling properties. Slightly lower corrosion resistance than type 430.
431	0.20 Max.	1.0	1.0 Max.	15.0 / 17.0	1.25 / 2.50	—	Martensitic type with superior corrosion resistance. USES – aircraft fittings, bolting materials, paper machinery, windshield wiper arms, jordan & beater bars.
440A	0.60 / 0.75	1.0	1.0 Max.	16.0 / 18.0	—	Mo – 0.75 Max.	Toughest martensitic type for cutlery. USES – bearings, cutlery, seam rolls, surgical & dental instruments, valve parts.
440B	0.75 / 0.95	1.0	1.0 Max.	16.0 / 18.0	—	Mo – 0.75 Max.	Martensitic cutlery grade with high hardness & good toughness. USES – ball bearings, valve parts, bushings, cutlery, surgical instruments.
440C	0.95 / 1.20	1.0	1.0 Max.	16.0 / 18.0	—	Mo – 0.75 Max.	Highest hardenable martensitic type. USES – ball bearings, valve parts, bushings, cutlery.
440F	0.95 / 1.20	1.0	1.0 Max.	16.0 / 18.0	—	S or Se at 0.07 Minimum	Free machining martensitic grade – 10 per cent improvement in automatic screw machines.
442	0.25 Max.	1.0	1.0 Max.	18.0 / 23.0	—	—	General purpose ferritic – good corrosion & heat resistance. USES – decorative trim, nitric acid storage tanks & tank cars, nozzles for zinc die casting machines.
446	0.35 Max.	1.0	1.0 Max.	23.0 / 27.0	—	Nitrogen – 0.25 Max.	Ferritic type. Highest corrosion & heat resistance of straight chromium types. USES – salt bath electrodes, rotary driers & retorts, radio tube parts, heat treating equipment, combustion chambers, nitric acid & sulfuric acid tank cars.

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a stainless steel sculpture by Robert Edward Hamilton

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New automatic combination washer-dryer now in mass production

designed for simplicity in operation
to meet a wide variety of service conditions
with convenience, economy, and safety;
and to provide quietness,
freedom from vibration, and ease of installation

Fig. 1 — Norge washer-dryer, showing trim, cabinet, glass door, and control panel.

MPM EXCLUSIVE FEATURE

RELATIVELY-FEW years ago, the design of a successful automatic home laundry washing machine (and later of an automatic dryer) was considered quite an accomplishment. Each offered its problems. They were rendered more complex by extended use of synthetic fabrics demanding extra care in temperature controls. It was not long, however, before the possibilities of a single combination washer-dryer were being investigated, as such a machine possesses some inherent advantages in space, and in needing less attention by the user.

by V. C. Rice • *VICE PRESIDENT, MANUFACTURING AND ENGINEERING, NORGE DIVISION, BORG-WARNER CORPORATION*

Naturally, a combined machine involves many complexities, but they can be met and still provide both dependability and flexibility; the latter to care for different types of load and for other diverse conditions. Good results have been attained, however, by Norge engineers in the design of such a combination machine. It is now in volume production at the Effingham plant. This new design was not considered proven, however, until after three years of testing, in which some 23,000 loads of clothes were washed and dried.

Seven point design program

Aims of our designers of the new Norge washer-dryer, Fig. 1, included: 1 — Compactness, despite large capacity; 2 — Superior washing, rinsing and drying; 3 — Quietness with substantial freedom from vibration; 4 — Flexibility as to type and size of batches, and to water temperatures; 5 — Safety and freedom from lint difficulties; 6 — Dependability along with accessibility for ready servicing when needed; and 7 — Ease of control.

Naturally, the design had to be one adapted to economical production and, as far as possible, to existing production facilities, but it was found necessary to add some new machines for production and assembly by welding of the tank and the perforated cylinder in which washing and drying takes place.

It was necessary that the machine should be basically an assembly of stamped components, most of which are fabricated within the plant. Several units, however, among them some that are cast, were needed. Other components, including the motor, controls, bearings, piping, valves, and many others, are purchased from specialists, as is common practice in the industry.

Many of the steel stampings are produced and undergo finishing in the Effingham plant. Among unusual purchased components are the fan and heater, the latter being an aluminum casting, and the fan, made from phenolic plastic. Heating elements are embedded in the heater casting. Useful also are a glass door component, various natural and synthetic rubber parts, and two concrete weights, these latter being elements of the inverted pendulum inertia vibration isolation system.

The external cabinet, which has a separate base and detachable panels, partly to facilitate servicing, measures 26¾ x 31 inches in base dimensions, and is only 36 inches high, not including the control panel. Inside this housing is a tank 28 inches in diameter and a cylinder or basket 26 inches in diameter. Also in the main cabinet are all other units except those of the control panel. Despite this compactness, the rotating basket has nearly five cubic feet of space for clothes, and up to nine-pound capacity in dry weight. Installation flush with a baseboard is readily made, and the counter top is flat with no openings.

Vibration isolation system

Support of the tank (which in turn supports the cylinder with its four drawn baffles and most of the operating mechanism) is on pivots at front and rear of

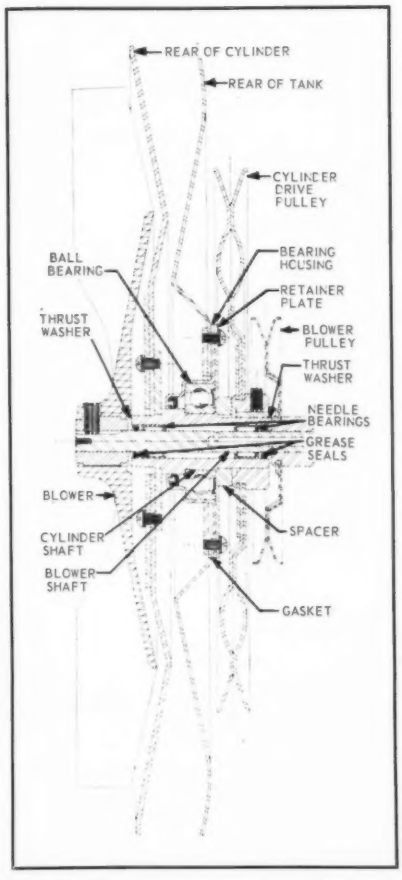


Fig. 3—Rear portion of the cylinder in section, showing ball bearing support, fan and its drive pulley, cylinder drive pulley, and associated components.

the base. A hydraulic shock absorber for damping vibrations is located at the lower left front corner of the base. Fig. 2. There are also two diagonal tension centering springs attached to tank brackets and extending to front corners of the base. These components, in addition to the two inertia weights held by bands to brackets outside the top sections of the tank, constitute portions of the inverted pendulum vibration isolation system. It is designed to avoid transmitted vibration, even when the clothes load is considerably off center and the basket is rotating at 225 rpm. This system makes it unnecessary to fasten the machine to the floor.

To permit the cylinder to rotate and still avoid a central bearing at the front, where it would interfere with loading and unloading, the forward end of the cylinder rests on four rollers that contact with the cylindrical bearing surface of the front end ring. At the rear, the cylinder rests in a ball-type trunnion bearing. Inside this bearing, Fig. 3, is a sleeve carrying needle bearings for the shaft of the fan or blower, located inside the tank to circulate air around the cast heater ring at the front and over clothes in the cylinder during the drying cycle.

Outside and back of the circular rear wall of the tank are pulleys, the larger one driving a sleeve attached to the cylinder, and the smaller one driving the blower, as shown in Fig. 3. One belt driven by a motor pulley having a clutch, drives the fan, as in Fig. 4. *(See Fig. 4 illustrations on page 63.)* Another (horizontal) belt drives to a large pulley on the primary shaft of a two-speed transmission, and a small pulley on the same shaft drives a belt for rotating the cylinder at 45 rpm during washing. Still another pulley, located on the front end of the motor shaft, drives a drain pump.

Operating cycles

During the washing and rinsing cycles, clean water is pressure-sprayed onto and through clothes in the cylinder and passes through its perforations into the tank. During all of the washing cycle, the basket turns at 45 rpm, sometimes in water held in the tank. After washing and rinsing, which is especially effective because water is constantly being sprayed on the clothes under pressure, the tank is drained. Then, the cylinder speed is increased to 225 rpm by a solenoid gear shift, Fig. 5, and spins out much of the water from the clothes, this water then being drained to

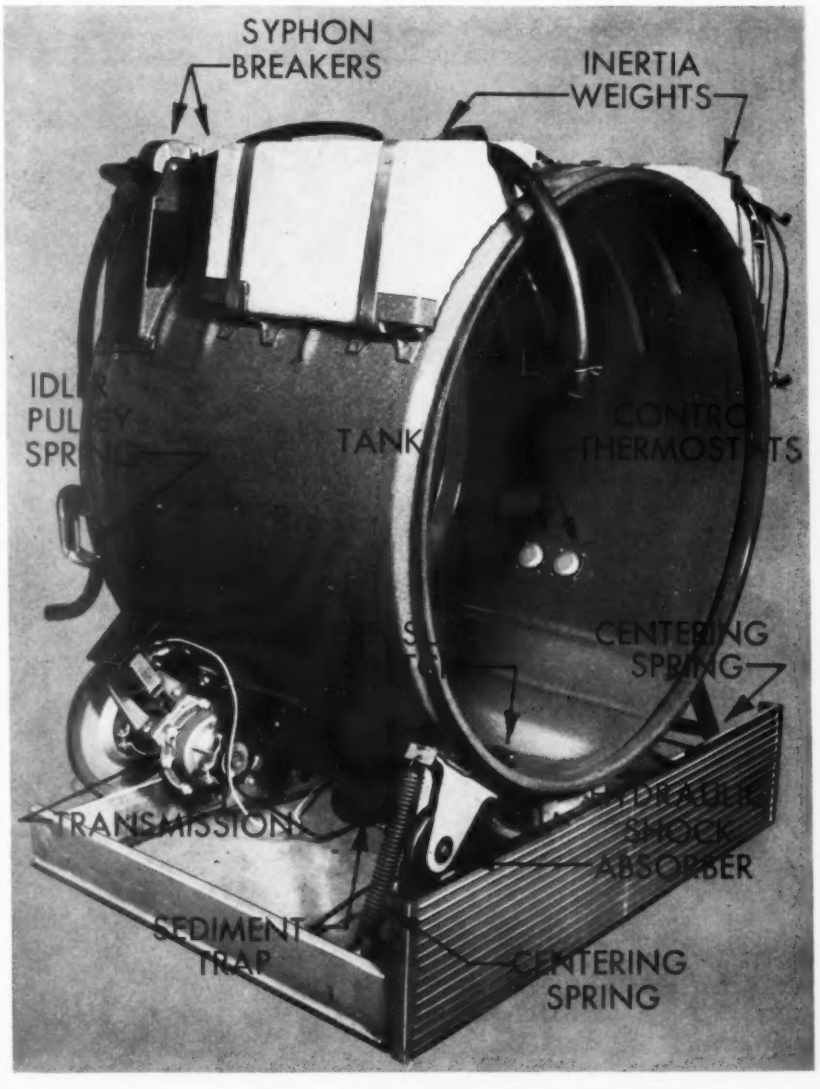


Fig. 2 — Assembly of the tank above the base, to which the tank is pivoted to form an inverted pendulum. Any tendency to oscillate is damped by the hydraulic shock absorber at lower left.

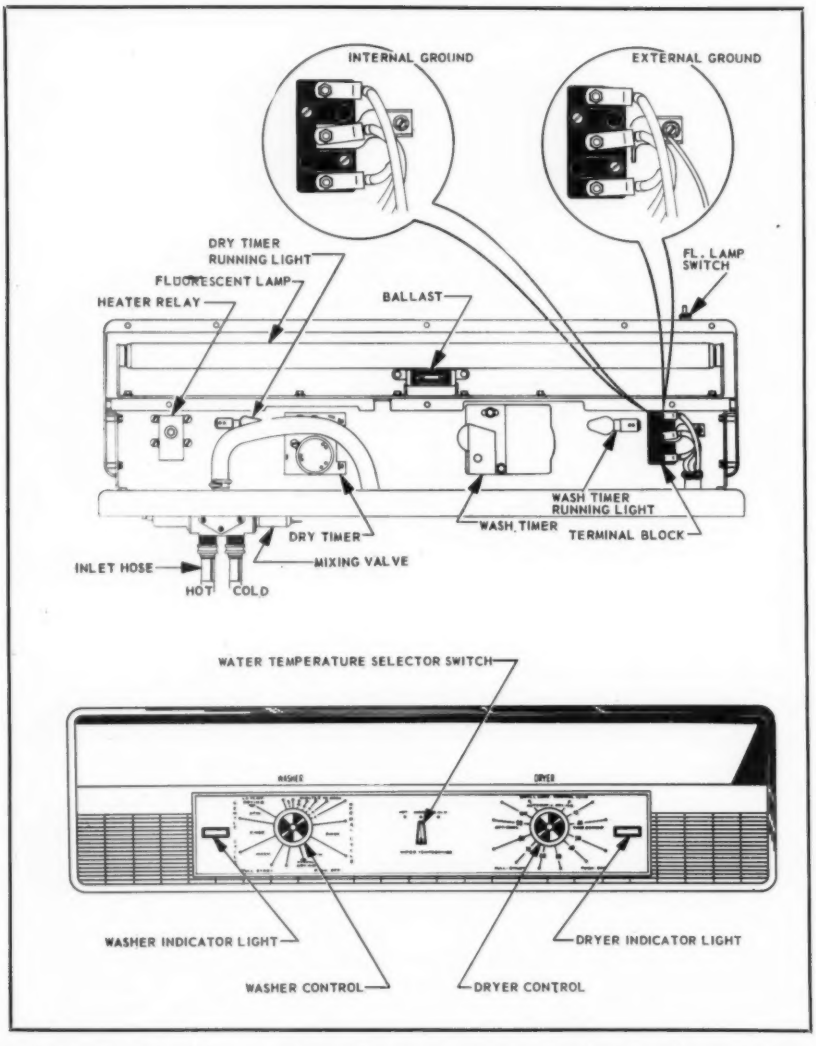


Fig. 6 — Front and rear views of control panel, showing location of timers and controls from rear, and control dials and water temperature selector from front.

waste. If desired, the cycle can be preset to stop after the spin-dry and wet-dry wash can be taken out.

In general, however, the cycle is continued to dry the clothes completely by heated air forced by the fan to circulate over and around the clothes as they continue tumbling. This air is recirculated but does not pass through ducts. Heat is added by a 5,600-watt unit as the air is forced over and around the hot surface of an annular aluminum permanent mold casting.

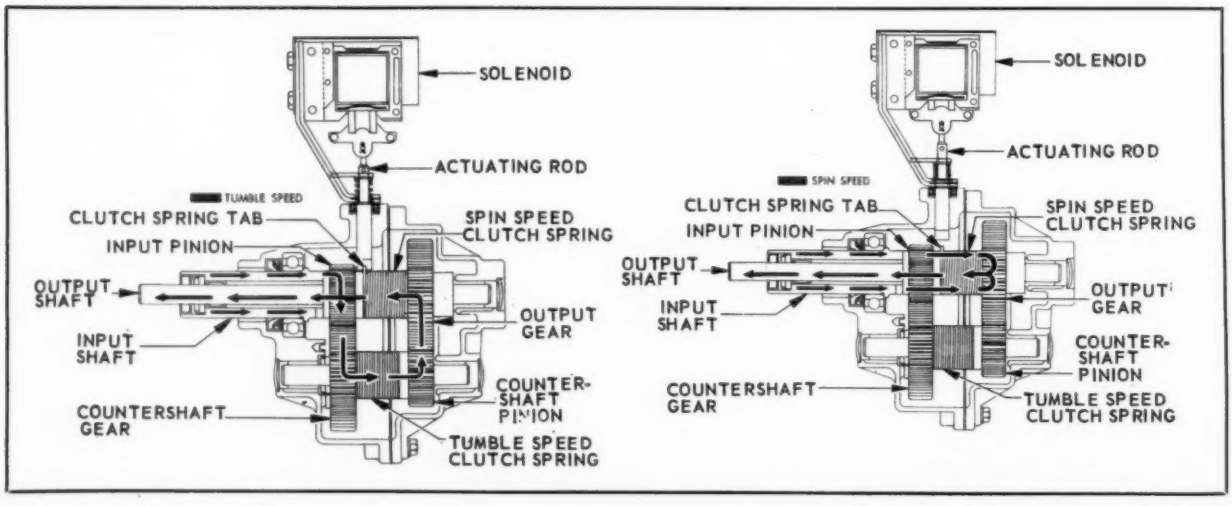
Heat absorbed by the air circulating around the clothing as it is tumbled evaporates moisture from them. This moisture is condensed as the warm air carrying it strikes a curtain of cold water that is applied to the inner rear wall of the tank, making it unnecessary to provide a moisture vent. Condensate, along with water applied to produce the curtain, flows into a sediment trap, carrying with it any lint, and is discharged via the drain pump to waste. Warm air drawn through the fan and across the water curtain is forced forward around inner walls of the tank and recirculates over the heater before reentering the cylinder to produce further drying action. Lint carried away from clothing during the washing cycle also enters the trap and is discharged to drain.

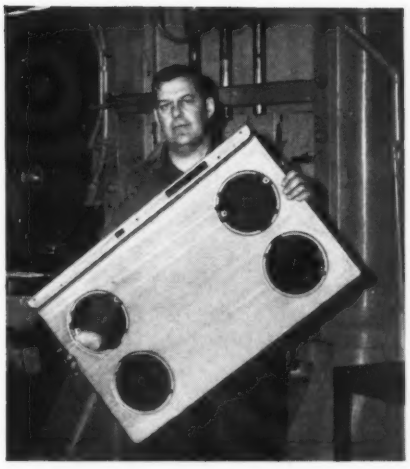
Visible laundering

At the front of the cylinder, there is a metal-framed and deeply-recessed glass set into the door. The inner surface of the glass contacts a circular synthetic rubber seal having several corrugations and, along with a baffle, helps to prevent clothing from moving axially out of

to Page 63 →

Fig. 5 — Two views of the two-speed gearset. Arrows indicate "power flow" during 45-rpm washing cycle and 225-rpm drying cycle. A solenoid controls shifting.





Sunray pressman
displays range top that has just been blanked and formed from a quality Youngstown Porcelain Enameling Sheet.

Accent on Excellence

Youngstown cold-rolled and porcelain enameling sheets

What modern young homemaker wouldn't be in "seventh heaven" when she prepares meals in her new kitchen, accented by this modern Sunray "TOUCH OF TOMORROW" —the world's first push-button, remote control gas range.

Both Youngstown Cold-Rolled Sheets and Porcelain Enameling Sheets are the basic raw materials used by the Sunray Stove Co., of Delaware, Ohio. This is one of the prime reasons Sunray product quality is so well known throughout the highly competitive appliance field. These highly dependable Youngstown steels provide Sunray with increased production, lowered reject rates, faster and more accurate forming as well as lowered fabrication and die costs.

Wherever steel becomes a part of things *you* make, the high standards of Youngstown *quality*, the personal touch in Youngstown *service* will help you create products with an "accent on excellence".

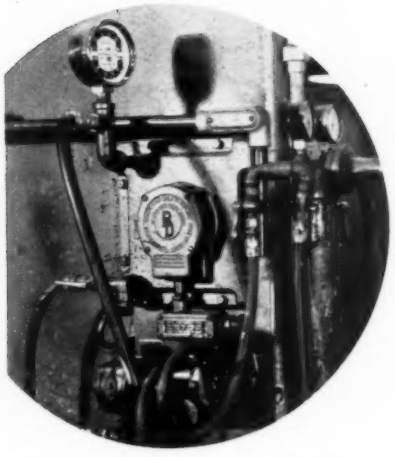
THE
YOUNGSTOWN
SHEET AND TUBE COMPANY
Youngstown, Ohio

Manufacturers of Carbon, Alloy and Yoloy Steel

Hot spray now a useful, proven aid to finishing

an up-to-date review of paint heating and how it has become a reliable help to organic finishing

AN MPM STAFF FEATURE



One type of paint heater in common use for hot spray finishing.

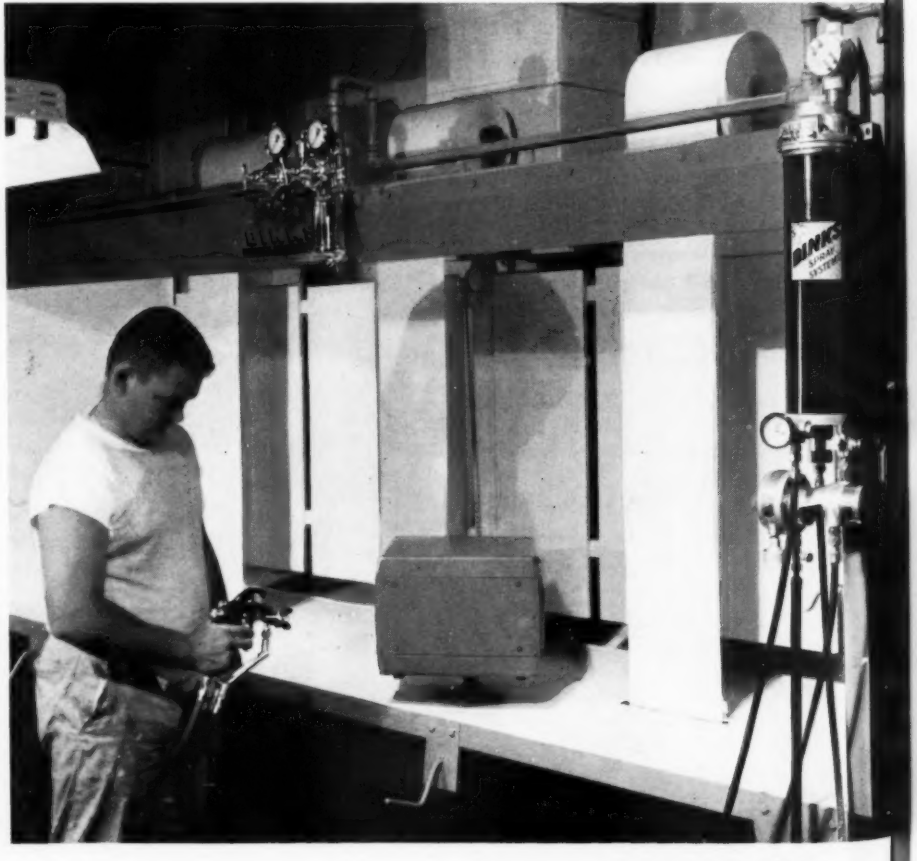
MPM EXCLUSIVE FEATURE

Every finisher today is striving for the best finish on his product with the lowest possible cost. One of the most useful tools at his disposal is controlled temperature or heated paint. The equipment available today, combined with the knowledge of how to use it, has made hot spray a useful, proven method to obtain a high quality finish at a reduced cost per square foot of finished product.

Paint manufacturers have contributed much of their time and effort to improve the knowledge of how best to use their materials. By working closely with finishers and application equipment manufacturers, the suppliers of paint have been able to come up with reliable data on the properties of heated paint. Now any finisher interested in what hot spray can do for him draws on the successful experience of many users of hot spray.

In the early days of hot spray finishing, many difficulties arose because of inadequate equipment and a lack of knowledge of how heating affects organic finishes. At first, heating paint seemed to be a cure-all for the problem of too viscous a paint in the morning. Usually the paint was thinned to a workable consistency, and then in the afternoon, when the temperature rose, the paint had to be readjusted for proper working viscosity. In some cases, heating the paint worked well, but in so many other instances, it did not. Probably the main cause of the difficulty was the belief that if paint heated to, say, 160° F. worked pretty well, then paint heated to 190° or 200° F. would work better. In some cases this was true, although now it is a well known fact that such high temperatures are not necessary. By turning the heater up to such levels, the paint's solvents evaporated very quickly when the paint left the spray gun, causing poor flow-out when the paint reached the surface. In addition, the paint heaters became clogged with hardened paint because, in order to produce temperatures of 200° F. in the paint, the heating elements were 240° to 330° F., due to transfer loss. Paint left in the heater after the line was stopped, or paint that came in closest contact with the heating elements, often hardened and clogged the passages of the heater.

Finned aluminum heaters, of the type shown here, have been designed to be taken apart easily for cleaning. Fins are so situated that paint is pumped between each fin before being fed into hose connecting spray gun.



Paints blamed for difficulties

Early misuse of hot spray led many to feel that the paint itself was at fault. They concluded that special formulations were necessary to give good results. Most of the trouble stemmed from the heating equipment itself, using too high a temperature, or using poor thinners, rather than the paint itself. In a few cases, a special formulation was, and still is, necessary.

Solvent balance an important factor

A very important factor to be considered in the use of heated paints is solvent balance. In a typical industrial finish, there usually is a blend of solvents, each of which evaporates at a different rate. What can happen in such materials is too rapid evaporation of "faster" solvents, causing entrapment of the "slower" solvents beneath the prematurely-hardened surface of freshly-applied paint. The too-rapid evaporation of faster solvents causes the surface of the paint to harden prematurely.

Often such defects as pinholing or blistering of the finish occur if the solvent balance is not correct. When the slower solvents finally do evaporate, they burst out, causing the defects.

If a paint is to be heated, it is not always true that fewer solvents can be used. Where reformulation is sometimes necessary to make a paint suitable for hot spray, it is in the balance of solvents. The paint manufacturer is best qualified to blend solvents properly so that the rate of evaporation is uniform. This is a key point to observe in the proper use of heated paints.

Better equipment and methods change picture

As improvements were made in heating equipment, and better methods were found to handle the paints, the picture changed in the organic finishing field, and more and more manufacturers recognized advantages in using hot spray.

One of the first improvements made in equipment was a re-circulation system to prevent paint from clogging the passages of the heater. In addition, this helped keep the temperature of the paint more uniform. Larger-area elements in heaters gives further control over temperature. Water jacketed heaters and hoses are available that deliver uniformly-heated paints right up to the spray nozzle. Finned aluminum heaters, recently introduced, have been designed to be taken apart easily for cleaning. The fins are positioned so that the paint is pumped between each fin before it is allowed to be fed into the hose connected to the spray gun.

A look at the advantages

The most obvious advantage of hot spray, of course, is the leveling out of morning-to-afternoon temperature fluctuations. These fluctuations cause the paint to be more viscous in the morning than at the middle of the working day. What is normally done then is to add solvent to the paint in the morning to bring it up to good working consistency. By the time afternoon arrives, the atmospheric temperature has risen, causing the paint to become less viscous. When this happens, virgin paint is added to the morning batch to bring it back to good working consistency again.

When this is done in a plant's finishing line, the actual viscosity of the paint varies considerably during the working day. Not only that, but the flow-out characteristics of the paint vary due to the fluctuating amounts of thinners or solvents in the paint. Here, then, is the chief advantage of hot spray. Good paint heating equipment, operated properly in conjunction with recommendations of the paint manufacturer, eliminates the problem caused by ambient temperature changes during a working day.

In the morning, the paint heaters are turned on to a pre-determined temperature level. Regardless of plant temperature fluctuations during the day, the paint remains at a constant viscosity. Even flow-out is assured on a uniform basis for the entire finishing line. Each operator on the line is supplied with the same viscosity paint, maintained at the same temperature.

Because of the fact that heated paints lower the viscosity of the paint, the use of thinners can be reduced considerably and, in some cases, eliminated. Therefore, the expense of thinners is reduced, enabling the production of higher quality finishes for the same, or possibly less, cost. In many cases, according to informed sources, the saving in thinners means doing away with the use of cheap thinners. The tendency on the part of some purchasing agents, and others in a position to specify the grades of paints and thinners, is to buy on the cheaper end of the scale. Many of the paint manufacturers have come up with improved finishes that have reduced the overall costs in a number of operations.

The point that should become clear here is that the finisher should be striving for the *lowest possible cost per square foot of finished product*, and *NOT* the lowest cost of materials per given quantity.

The advantage of better film build also means fewer passes of the spray gun to do the same job. This is a sizable improvement in effort, both in hand spray and automatic operation.

Other advantages resulting from hot spray are: better flow out, higher gloss, faster dry, lower atomization pressures, and less overspray and rebound. These advantages, to a great extent, depend on each other. For instance, the lower atomization pressure required makes possible less overspray and rebound.

Use not limited to spraying

Hot spray can be used to advantage with other organic finishing methods besides spraying. Roller coating, flow coating, pressurized flow coating, and electrostatic spray all are improved with the use of paint heating. Control of viscosity is just as important in these methods as it is with hand spray.

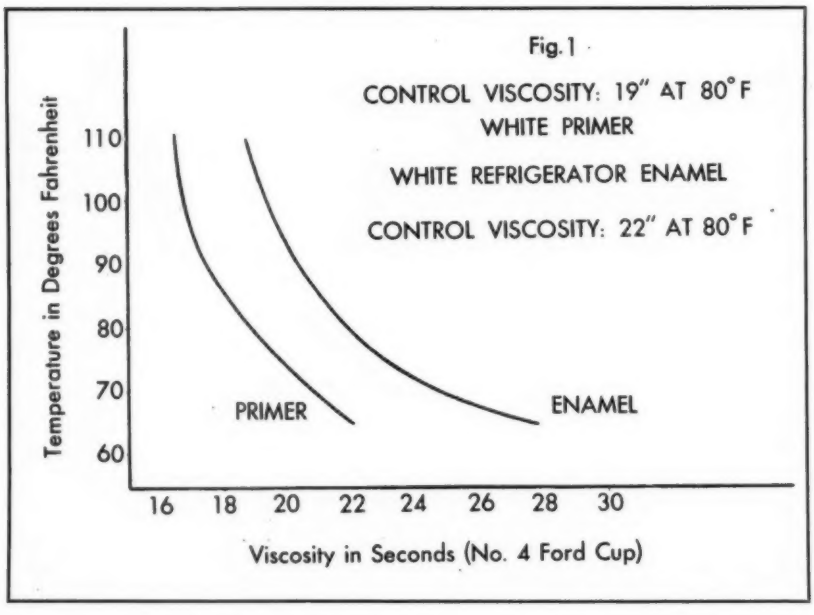
With roller coating and flow coating, cutting down on solvents means less danger of inflammable vapors and the same advantages of flow out, gloss, and build up, as cited previously for spraying.

Electrostatic spray benefits in a similar way: better film build, easier control, better flow out, and better gloss. The latter two factors are as important in electrostatic finishing as they are in spraying.

Temperature vs. viscosity important

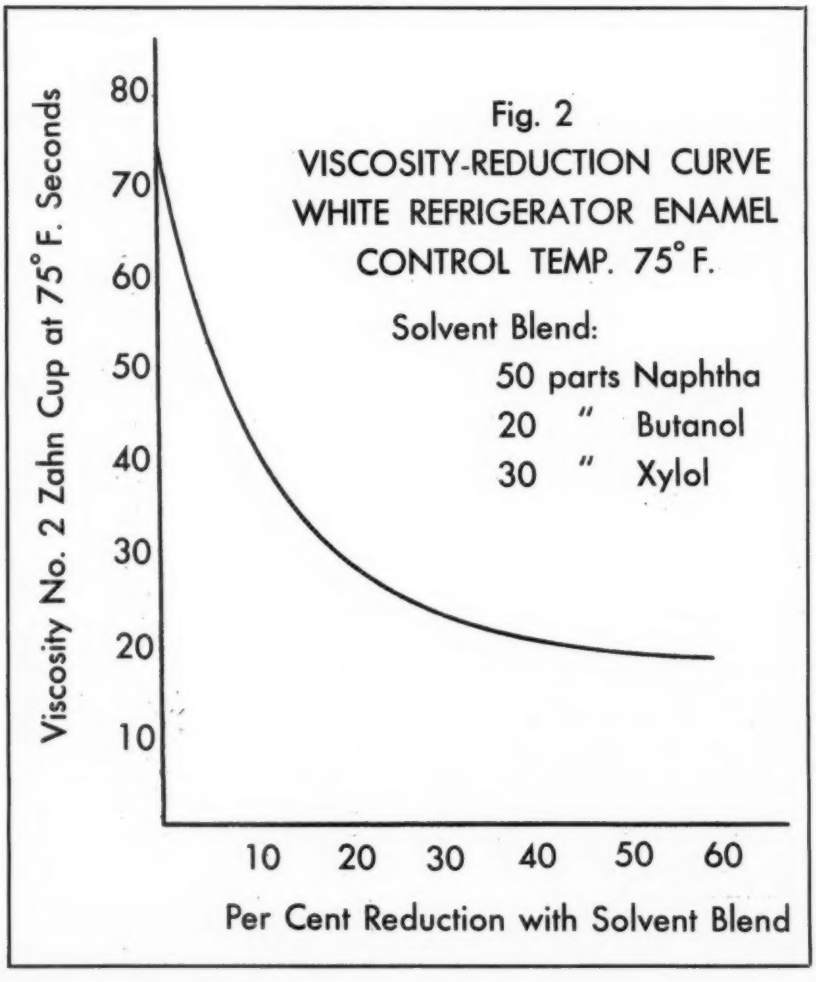
Although each type of paint will provide slightly different viscosity-temperature curves when plotted on a graph, they are all relatively similar. As the temperature rises, the viscosity of the organic material decreases fairly rapidly up to 100° to 140° F., depending on the composition. Beyond these temperatures, the rate of change in viscosity diminishes. Each paint material has its own characteristic curve that indicates the best temperature for the best results in application. See Fig. 1 & 3 for a typical plot of viscosity vs. temperature for a refrigerator enamel. This plot is not carried beyond 110° F., but if it were, it would show a decrease in viscosity only a bit less than shown at 110° F.

With these facts in mind, every potential user of hot spray equipment should first contact his paint supplier before he calls any equipment manufacturer. The paint supplier can tell the interested user whether or not the paint he is using is compatible with heat and, if not, the supplier can tell what changes have to be made in order to have a compatible paint. Normally, it is just solvent balance, but sometimes, it means reformulation of the material. Paint suppliers should recommend the kind and quantity of solvent to be used, and the maxi-



mum temperature that the paint will take without causing plugging or polymerizing problems in the equipment.

If the correct paint is used, and the heater is operated properly, there is no reason for a paint heater to plug up. Unfortunately, heaters plug up constantly, and users accept that as a normal part of the operation. Usually, heaters plug up either because the paint is incompatible to the temperature being used or the paint should not be used with heaters at all.



According to finishers experienced in the use of hot spray, a temperature range of 140° to 160° F. should be the limits in heating paints. There are a few materials such as the catalyst-type finishes that need temperatures of 180° to 190° F. in order to reduce the original viscosity to a sprayable consistency.

Each individual user of hot spray equipment has different requirements in the type of product he is painting, finish being applied, quality of finish, and production rate. Factors which must be taken into consideration when a switch to hot spray is contemplated are atomization pressure and spraying technique. Atomization pressures often need to be adjusted to the viscosity of the paint after it is heated. Techniques in spraying also need to be changed because of the change in working qualities of the paint. These changes, of course, vary with each operation, and must be studied with the aid of material and equipment suppliers to arrive at a satisfactory method. Once specific methods are determined, the finisher is usually assured of good results.

Above 160° F., seeding out may occur in the paint. Seeds in paint are undesirably-large particles which develop in a liquid coating by agglomeration of pigment particles, or by gelation of part of the vehicle.

Example of improvement

The following comparison of hot spray vs. cold spray was made on a yellow lacquer on one of the paint equipment manufacturer's heating setups: *Cold Spray*. Following the manufacturer's directions, the lacquer was reduced 100 per cent with the recommended thinner, which brought the viscosity to 22 seconds Zahn No. 2 at 78° F.

Using a spray gun with an .046"-opening in the nozzle, the test part required three successive coats to obtain a 1½-mil dry coat with very poor pigment hiding power, over an unprimed sheet metal panel (2 ft. x 4 ft.) To obtain hiding power, a primer compatible to the lacquer would have to be used. To apply more than three coats would cause sags and runs.

Pressure used: 45 lbs. atomizing pressure at gun; 8 lbs. fluid pressure (16 oz. per min.) at gun.

Hot Spray. The same material was reduced 25 per cent with the recommended retarding solvent which brought the vis-

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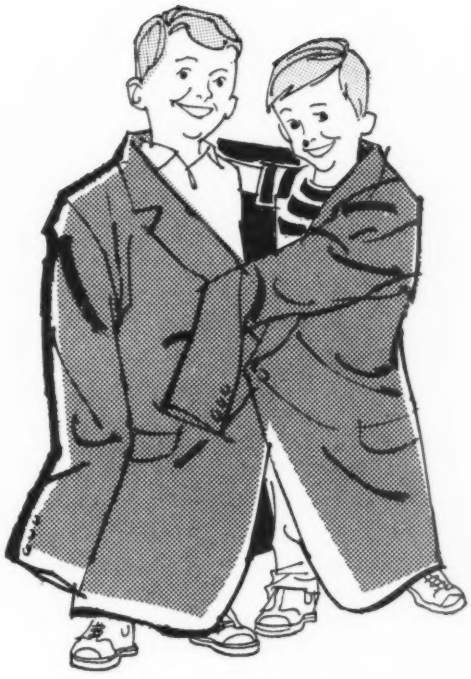
One coat does the job of two with Lowe Feuzon



Here's another example of what can happen when one of Lowe Brothers finishing engineers understands your problem. Check this engineer's report:

"The paint department foreman said that it was necessary to apply 2 or 3 coats for good coverage — especially when the metal had dark spots. He tried an order of Feuzon Gray Metallic and found it covered beautifully with one coat. When he has used up the competitive material in stock, he'll order our Lowe Feuzon."

Lowe Brothers finishing engineers are trained to find ways to cut painting costs. They're experts on paints *and* finishing methods. Your nearby engineer will gladly make a "flow-chart" analysis of your finishing system. No obligation. Just send the coupon.

LOWE BROTHERS
INDUSTRIAL FINISHES
QUALITY UNSURPASSED SINCE 1870

Style-tested paints for Home and Industry

REPRESENTATIVES IN: Chicago, Ill. • Boston, Mass. • Jersey City, N. J. • Cleveland, Ohio • Pittsburgh, Pa. • Rochester, N. Y. • Dayton, Ohio • Columbus, Ohio • Milwaukee, Wis. • Indianapolis, Ind. • Cincinnati, Ohio • Detroit, Mich. • Springfield, Mass. • Philadelphia, Pa.

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MPM

☐ Please have my nearest Lowe Brothers Finishing Engineer call on me as soon as possible.

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NEW

SUPPLIES & EQUIPMENT

Water Heater Thermostats

A complete line of automatic gas water heater thermostats, said to incorporate full 100 per cent safety shutoff and safe lighting by means of a Baso thermomagnetic safety control, has been announced.

Featuring a "million-cycle" snap disc, the

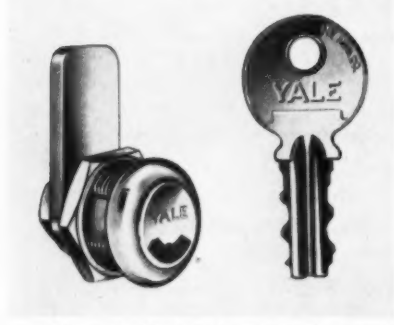
thermostats are said to have a simplified internal design which virtually eliminates service problems. Exterior design is said by the manufacturer to be compact and modern in appearance.

Three models are said to be available: D4000B, deluxe model; D4000A, standard model; and D4000C, economy model.

For further information, contact Dept. MPM, Deutsch Controls Corp., 14504 S. Figueroa St., P. O. Box 61216, Los Angeles 61, Calif.

Vending Machine Lock

A vending machine lock, designated the 8100, is said to meet the highest security requirements for vending machines and parking meters, it has been announced. The lock is op-



erated by a double-bitted parabolic key which cannot be duplicated, it is claimed, and has a twin side bar mechanism which provides the maximum obtainable resistance to picking in a key-operated lock.

For further information, contact Dept. MPM, The Yale & Towne Mfg. Co., Chrysler Building, New York 17, N. Y.

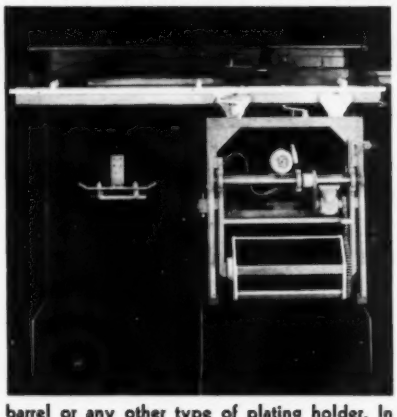
Inventory Control System

A system which is said to maintain a complete, easily accessible, easy-to-see stock of bolts, nuts, and standard and special fasteners, is available. Called "Flex-a-bin," the system consists of bins containing row on row of 1 qt.-containers in which are kept various sizes of bolts, nuts, etc. The vendor sets up the system in the customer's plant, sorts and labels the stock, installs the bins, and stocks all items according to customer's needs. Regularly-scheduled stops are made by the vendor to restock empty or partially-empty bins, and a charge is made only for the fasteners. There is no charge for use of the bins nor for the personnel setting up the system.

For further information, contact Dept. MPM, Automotive Hardware Co., 7030 W. Roosevelt Rd., Oak Park, Ill.

Unveil Combination Revolving Plating Barrel and Indexer

A new development for the plating industry was unveiled recently in Chicago at the annual American Electroplaters' Society. Basically, the new device is a barrel plating machine that automatically raises, lowers, and rotates a plating



barrel or any other type of plating holder. In addition, the device automatically indexes the carriage in any tank desired. One of the outstanding features of the mechanism is that a single motor drives the entire operating cycle. A single control panel is used to guide the operation of the machine.

Other important features of the machine are: standard cylinders to simplify replacement; standard parts for easy replacement; and a design that allows "adding to."

For further information, contact Dept. MPM, Udylite Corp., 2859 N. Natoma Ave., Chicago 34, Ill.

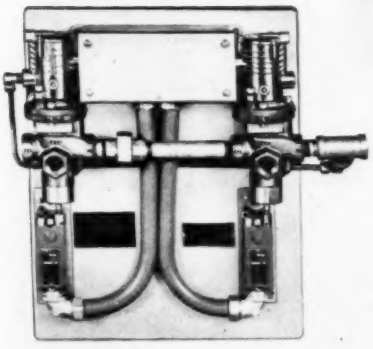
Silk Screens for Industry

Reportedly low-cost silk screens for industrial applications are now being manufactured. These screens are said to be ideal for printing schematic diagrams, electrical circuits, dials, and other markings for electrical computing instruments and equipment. They can be used for decorating objects with painted or baked surfaces such as nameplates, ash trays, TV sets or chassis, etc.

For further information, contact Dept. MPM, Crown Electronics Div., Marathon Metal Products, Inc., Cortland, N. Y.

Pilot-Operated Control Valves

Use of specially-designed pilot-operated control valves in a new fail-safe, anti-repeat press control system has been announced. Selected for this application because of their so-called



split-second response, inherent operating characteristics, and simplicity of construction, the valves are paired in tandem to afford positive cut-off of air, and to insure dependable anti-repeat action, according to the manufacturer.

For further information, contact Dept. MPM, Valvair Corp., 454 Morgan Ave., Akron 11, Ohio.

Additive Boosts Paint Stripping Power

An additive, designed to enable alkaline paint stripping solutions to remove difficult synthetic finishes, has been developed. Known as Stripper Additive No. 4, the product is a solvent, and is said to convert a narrow-range stripping solution into a wide-range solution capable of removing epoxy, acrylic, and similar tough finishes.

For further information, contact Dept. MPM, Oakite Products, Inc., 145B Rector St., New York 6, N. Y.

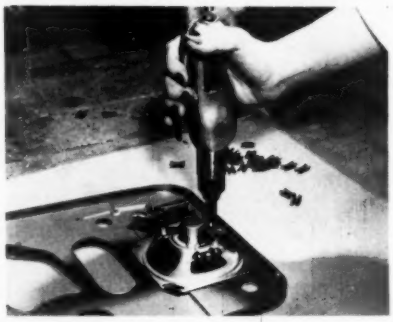
All-Purpose Alkyd Enamel

An all-purpose alkyd enamel, called Industrial Speedenamel, has been announced. For exterior and interior metal and wood applications, it is adaptable for brush, spray, or dip application.

For further information, contact Dept. MPM, The Glidden Co., Cleveland, Ohio.

Light Weight Air Hammer

A light weight air hammer for attaching "push-on" fasteners has been announced. According to the manufacturer, the Model SP-900B attachs fasteners such as "Pal-Nuts" or



"Speed-Nuts" uniformly in 1/3 the time taken by ordinary hand methods. The manufacturer also states that, since the unit is light in weight, assembly personnel can operate it easily without tiring.

For further information, contact Dept. MPM, Superior Pneumatic & Mfg., Inc., 4758 Warner Rd., Cleveland 25, Ohio.

JACK-HAMMER FAILS TO FLAKE INLAND TI-CO®!

Crumbling concrete is easy with this powerful paving breaker. It hits with crunching impact at the rate of 1,200 blows per minute with 75,000 ft. lbs. of developed energy. Yet, while thousands of repeated blows actually hammered this TI-CO galvanized sheet into the ground at the point of contact, there wasn't a trace of flaking of the zinc coating!

More proof that you can subject TI-CO sheets to deep-drawing, spin-drawing, punching, crimping, perforating, Pittsburgh lock-seaming or any other tough fabricating process, and you won't flake TI-CO!

That's why Inland TI-CO galvanized sheets are now being used in scores of new applications and products. TI-CO is available in cut sheets or coils in gages 8 to 30 inclusive and widths as great as 60 inches. You can get it with dry, oiled or chemically treated surfaces to meet your production needs. A free, informative booklet will be sent you upon request. For your galvanized sheet requirements, consult your Inland representative.

Hammer operator runs finger around depression made in TI-CO sheet. Although hammered area resembles a shot-peened finish, the zinc coating has not flaked

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A full-scale wall panel that promises to light tomorrow's home while also heating or cooling it has been unveiled by Westinghouse Electric Corp. The "hot-cold-light" panel combines thermoelectric heating and cooling, and electroluminescent lighting, according to Chris J. Witting, Westinghouse vice president and general manager, consumer products.

New vertical trim room air conditioners designed by Frigidaire for 1959 feature new dry-cooling systems and extra quiet operation. Sheer look styling and new sand color blend with any decor.

Several top Admiral executives, with a lovely helper, serve up tidbits hot from the built-in oven in Admiral's new exhibit kitchen. Left to right, B. H. Melton, national sales manager, appliances; Wendell Evans, Biederman Furniture Co., St. Louis; C. E. Lantz, vice president, sales; and J. R. Oberly, vp, appliances.

The Worthington Corp. r... integrated refrigeration c... and direct coupled drive ... made simpler by making ... able between the field ser... sor and the coupled com... local invento...

Chambers Built-Ins, Inc., backed by the most successful sales record in recent history, has marketed new models and designs of matched and packaged built-in kitchen appliances for 1959. Included are gas and electric ovens and surface units, refrigerator-freezers, dishwasher-dryers, disposers and ventilating hoods.

. . . foto-news

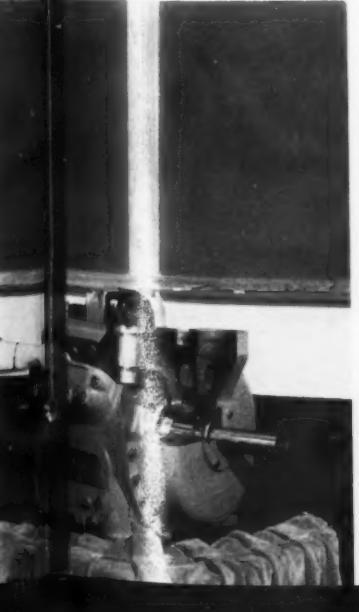
The built-in rotisserie of the Norge gas wall oven is adjusted by a housewife by means of a removable rack and spit. This unit has two ovens for baking, roasting and broiling independently.

The "Gold Star of Quality" occupied a prominent spot at the recent annual sales conference of the Geo. D. Roper Corp., Kankakee, Ill. Shown here with the seal are (from left): Harold Jeske, executive vice president; N. C. Kreuter, vice president in charge of sales; W. J. Foster and E. Carl Sorby, vice presidents; and John P. Wright, president.

Oasis adds an entirely new water cooler to their Constellation series, called the Bubbelet. The Ebco Mfg. Co. states that it is a smaller size water cooler, designed for maximum economy and efficiency. It takes only one square foot of floor space and stands only 40½ inches high.

Tradition has been broken in the design and manufacture of a carpet sweeper. A revolutionary new design, "Magic Disc," has been imported from Sweden and adapted to high speed, low cost production methods by Interstate Precision Prod. Corp., Anaheim, Cal.

orp. ... premiered its new ...ssor line of hermetic ... drive ... Servicing has been ...ponents interchange- ...le hermetic compres- ...or. This reduces the ...equired.



Located conveniently in the kitchen and styled to fit kitchen design, the Westinghouse quick recovery water heater can deliver 2½ times more hot water than standard wattage units. The heater features the Magnemiser System which stops electrolytic corrosion of the tank. The lining of the tank is porcelain enamel fused to the entire interior.

Pickling procedures and adj

covers some of the unusual metal preparation proble

by Harold C. Wilson • VITREOUS STEEL PRODUCTS CO.

AT ONE TIME OR ANOTHER, every enameler has faced the problem of removing unusual soils. The fact that he may rarely be faced with the problem, the more unusual it becomes, and being a seldom-encountered condition, the less-equipped he may be to cope with the situation.

It would seem that in the largest, most-modern plants using only specification sheet, approved drawing compounds, and rigid controls, there could be no metal preparation problems; but even under those conditions, we are told that once in a while something gets crossed up. For example, if a pressroom foreman is having difficulties in drawing a certain shape, perhaps as a result of age-hardened steel, or as a result of the complicated design of the piece, and the superintendent is walking back and forth sharpening his knife, he is going to use any means available to get off the hook, and the methods he adopts might not always be to the best interests of the enameler. In fact, it is surprising if the cleaning problem ever enters the mind of the pressman at such a time.

Soils often easily cataloged

In general, the types of materials that are encountered are easily cataloged; even the more ingenious mixtures concocted by some forming departments. These could be classified as follows: (1) Vegetable and animal oils, (2) Mineral oils, (3) Pigmented compounds, (4) Graphite compounds, (5) Silicones, (6) Plastic compounds, and (7) Waxes.

There are basically-few methods of removing the above materials. These can be listed as follows: (1) Saponify the oils (vegetable or animal), (2) Dissolve, including vapor degreasing or other solvent type cleaner, (3) Melt and float off or emulsify, (4) Burn off (oxidizing or reducing atmosphere), and (5) Blasting — sand or grit.

One or more of the above methods may be used in soil removal as required.

How to apply in actual practice

Now let's see how we can apply the above in actual practice. Suppose one receives a batch of material coated with a heavy grease that is not saponifiable. Chances are that if a high enough temperature can be obtained in the cleaner, it will melt the grease and it can be emulsified and floated off. This immediately indicates the value of hot cleaner, 212° F. Agitation will speed the removal, and this is best obtained by a rolling action in the tank.

The material can be floated from the surface of the solution over a dam in the tank, and then the process repeated in a second and perhaps a third-stage operation, always remembering the necessity for high temperatures and emulsification together with floating off the loosened oil or grease. Next, a hot and cold rinse should be employed, followed by conventional pickling and rinsing. At this point, water breaks may be noted, indicating that the pickling has opened up metal pores or pockets not previously reached by the cleaner. The ware should then be returned to the cleaner and the original operation, including rinsing, repeated.

Pigmented drawing compounds

Next suppose Mr. Pressman wants to get a little more guts in his compound. He will resort to a pigmented material and will make the most perfect draws anyone could desire. The ware is cleaned and pickled, as usual, and looks real nice in black iron, but when enameled is as blistered as an albino at a beach party. Perhaps, instead of a pigmented compound, he has resorted to a graphite solution, and the enameler has ended up with a finish that looks like someone has sprinkled it with a pepper shaker. A highly-alkaline cleaner isn't of any particular value on this stuff, but might help in removing the companions of the graphites.

However, as a starter, a good cleaner at say six ounces per gallon at a rolling boil should be used, followed by vigorous rinsing with extreme care being used not to contaminate the acid and subsequent tanks. Surface active agents added to the cleaner can help in removing the inert materials. Finally, after the entire cycle is completed, the ware should be wiped with clean cloths or, perhaps in the case of graphite, wiped with cloths soaked with a chlorinated solvent, remembering, of course, the toxic nature of many of these solvents.

Where burn-off is required

At times, one will encounter soils that just will not clean off with normal or abnormal cleaning and pickling methods —and this includes vapor degreasing. In cases of this kind, burn-off may be required followed by scale removal. It isn't necessary normally to clean before scale removal, since the burn-off does the cleaning job, but overpickling should be guarded against. Some high-melting waxes and some silicones, as well as certain plastic compounds, may require a burn-off, but many will respond to solvent removal or even alkaline cleaning.

The cost problem

All of the above tells us very little that will be of much help unless we can translate it into some sort of reasonably-economical system to fit our respective installations. In our own plant where immersion methods are used instead of spray pickling, the problem is not quite as acute, and a little more flexibility is possible, but the cost problem is just as important.

For this reason, methods must be used to reduce the time, and consequently the labor factor, to a minimum, even if it means increased material costs. Keeping this in mind, we select materials to do the metal preparation primarily to save labor and, at the same time, do the job. It is not sensible to buy a cleaner that requires twice the time to clean, cleans part of the soils encountered, or has half the life even if it does cost only half as much.

Strange as it seems, 90 per cent of the ware could be cleaned with materials costing one third as much as those nor-

d adjustments for various soils

on roblems that arise in a porcelain enameling plant

mally used, but the remaining 10 per cent justifies the normal price we pay, since three hours of poor cleaning can wipe out a year's savings in inferior materials.

Basis of selecting cleaner

Again returning to the subject, adjustments for various soils emphasize that the cleaner must be adjusted for the hard-to-clean 10 per cent of the ware. This means selecting a well-balanced material capable of saponifying, capable of providing surface action, capable of softening the water and, above all, capable of cleaning the ware. Price alone will not guarantee these properties but, conversely, a very low price will pretty well indicate something is missing.

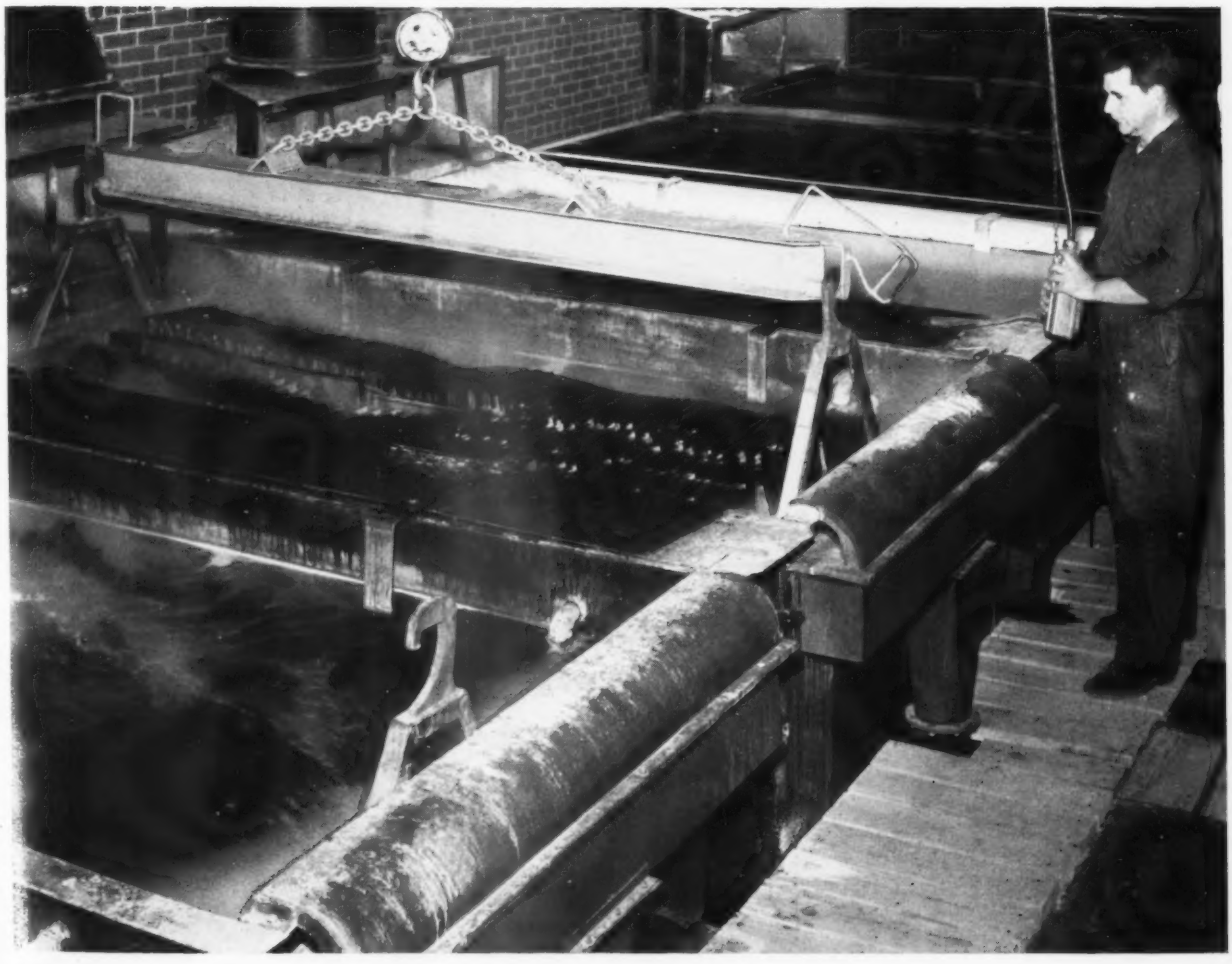
The age of the cleaner is important, or rather the footage of throughput. When the ground coat starts coming out poorly textured, it might not be due to a new pressroom recipe; instead, it might be time to dump the cleaner or recharge the acid and nickel tanks.

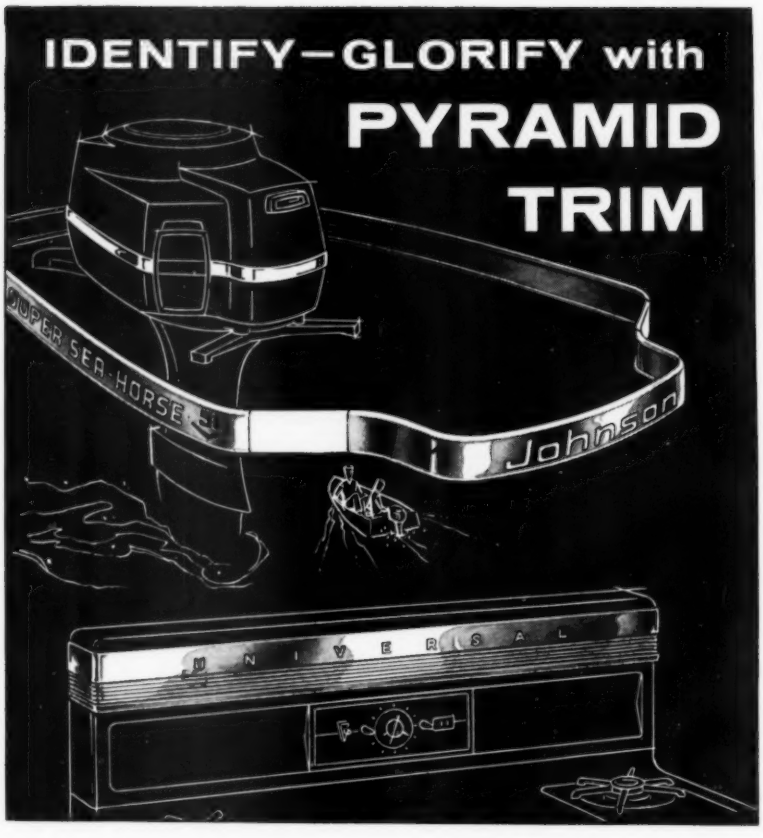
We realize that most of the above information is part of the old enamelers primer, but it is repeated to emphasize in the light of present day developments that there is no antibiotic for curing many metal cleaning ills in spite of the many improvements in cleaner formulation in the last decade.

The best adjustment one can make is the ideal situation of designing a piece so it can be formed, use steel that is recommended (heat treated) for the job, bury the graphite and pigmented compounds behind the shop, clean the ware promptly after forming, buy good cleaner, operate it hot enough to clean, and don't try to set a longevity record in its use.

Adapted for MPM *from a paper presented at the 20th Shop Practice Forum of the Porcelain Enamel Institute, Urbana, Ill., November, 1958*

Operator charging load of parts into bath heated by plate-type transfer unit.





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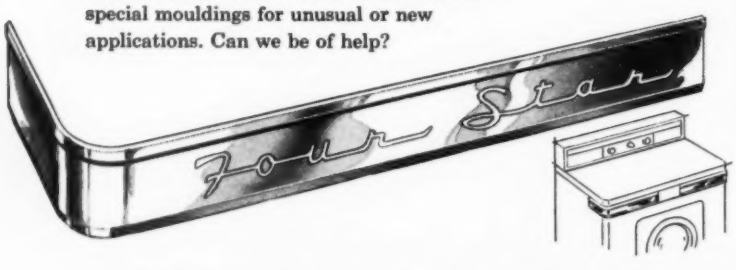

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INDUSTRY MEETINGS

ELECTRIC SIGN

National Electric Sign Association's Convention and Exhibit, Morrison Hotel, Chicago, March 1-4, 1959.

PRESSED METAL

Pressed Metal Institute's 10th Anniversary Spring Technical Meeting, Pick-Congress Hotel, Chicago, Ill., March 11-13, 1959.

METAL EXPOSITION

Eleventh Western Metal Exposition and Congress, American Society for Metals and Other Technical Groups, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles, Calif., March 16-20, 1959.

GAS APPLIANCES

Gas Appliance Manufacturers' Association's Annual Meeting, Americana Hotel, Bal Harbour, Fla., April 1-3, 1959.

WELDING

Fortieth Annual Convention and Welding Show, International Amphitheatre, Chicago, April 6-10, 1959.

BUILDING RESEARCH

Building Research Institute's 8th Annual Meeting, Penn-Sheraton Hotel, Pittsburgh, Pa., April 7-9, 1959.

PACKAGING

American Management Association's 28th National Packaging Exposition, International Amphitheatre, Chicago, April 13-17, 1959. Concurrently, National Packaging Conference at Palmer House, Chicago, April 13-15, 1959.

POWDER METALLURGY

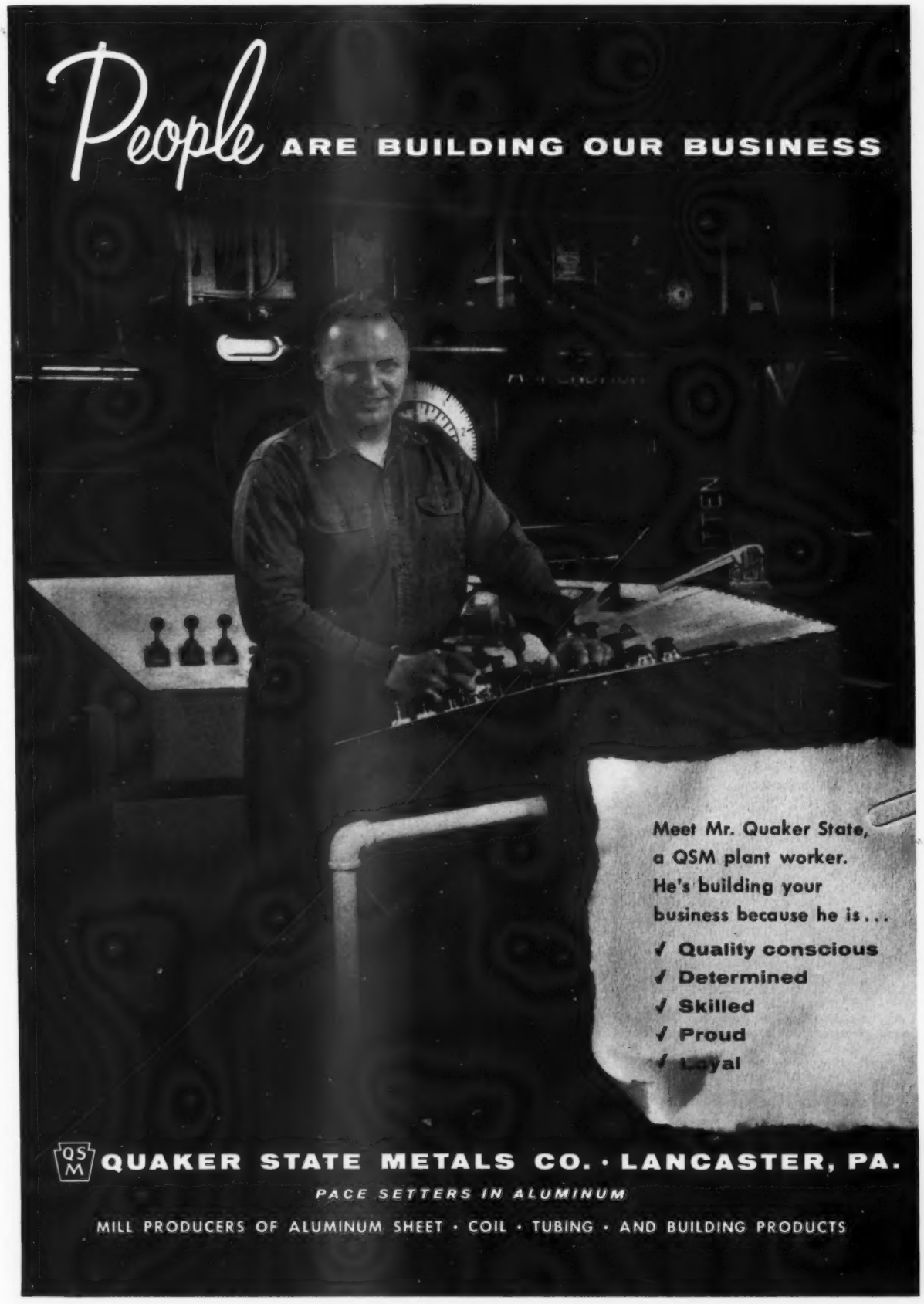
Powder Metallurgy Show, Sheraton-Cadillac Hotel, Detroit, Mich., April 20-22, 1959.

AIR CONDITIONING

Air Conditioning and Refrigeration Institute's Board and Annual Meeting, The Homestead, Hot Springs, Va., May 3-6, 1959.

PORCELAIN ENAMEL

Porcelain Enamel Institute's Mid-Year Divisional Conference, Edgewater Beach Hotel, Chicago, May 13-14, 1959.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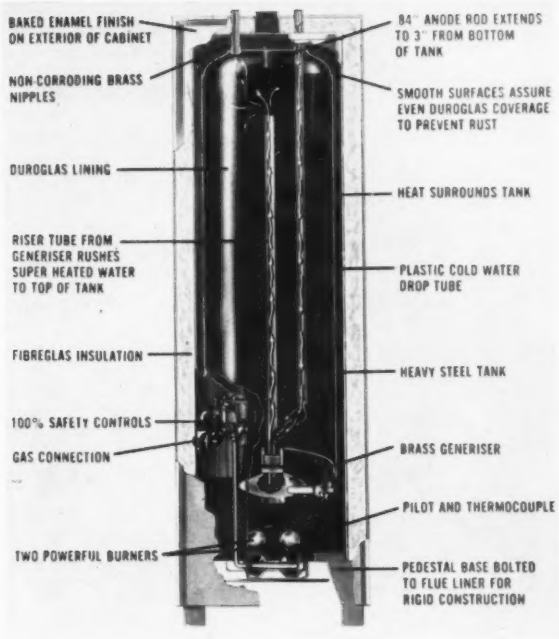
BAKED ENAMEL FINISH ON EXTERIOR OF CABINET
NON-CORRODING BRASS NIPPLES
DUROGLAS LINING
RISER TUBE FROM GENERISER RUSHES SUPER HEATED WATER TO TOP OF TANK
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84" ANODE ROD EXTENDS TO 3" FROM BOTTOM OF TANK
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HEAT SURROUNDS TANK
PLASTIC COLD WATER DROP TUBE
HEAVY STEEL TANK
BRASS GENERISER
PILOT AND THERMOCOUPLE
PEDESTAL BASE BOLTED TO FLUE LINER FOR RIGID CONSTRUCTION

(Left) — Cutaway drawing shows construction features which give Five Star General heater its reportedly high recovery rate.

(Below) — Designer Tor Petterson (right) demonstrates operation of eye level operating control of heater to Clifford Nelson, director of the California Design Exhibition.

Water heater attractive and functional

TRADITIONALLY, THE WATER HEATER has been secreted behind the walls of the average home, since there was nothing in its appearance that would lend itself to an open installation, as is the case with refrigerators, ranges, etc. However, during recent years appliance designers have made a genuine effort to change this situation.

A good example is a stylized gas water heater designed by Tor Petterson, Tor Petterson Associates, Pasadena, Calif., called the Five Star General, and manufactured by the Holly-General Co., a division of the Siegler Corp. The new heater was shown in one of the country's top good-design exhibits, the California Design Exhibition of the Pasadena Art Museum, which ran from January 11 to February 22.

Some of the features of the prize-winning heater are: A modern, square front completely compatible with contemporary designs being featured on major appliances; and a greatly simplified operation, achieved through the development of a single control placed at eye level.

The percolator principle

The heating system is said to give this unit a fast "recovery rate." To accomplish this, Holly-General uses a "generizer," which draws cold water to the heat source for immediate heating, then directs it to the top of the "Duroglas" tank through the use of its own heat. The principle is something akin to a coffee percolator. In this way, the warmest water is always closest to the source where it is drawn off for household use. With this internal device, and a two-burner heating system, the new unit is designed to process up to 70 gallons of water per hour through a 40-gallon tank.

The heater is made of 22-gauge cold rolled steel, and is finished with baked enamel. It is designed so that all panels can be fabricated with relatively-simple stamping processes, and the entire cabinet, including frame and panels, is assembled with only ten screws.

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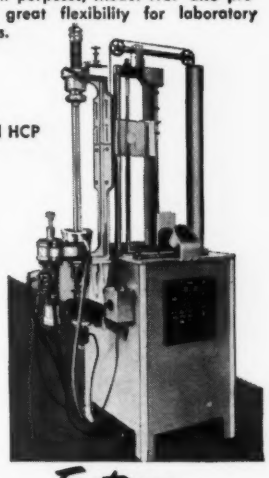
Model HCP



Features

- **A smooth, positive mechanical drive system with continuously variable up, down and rotational speeds, all independently controlled.**
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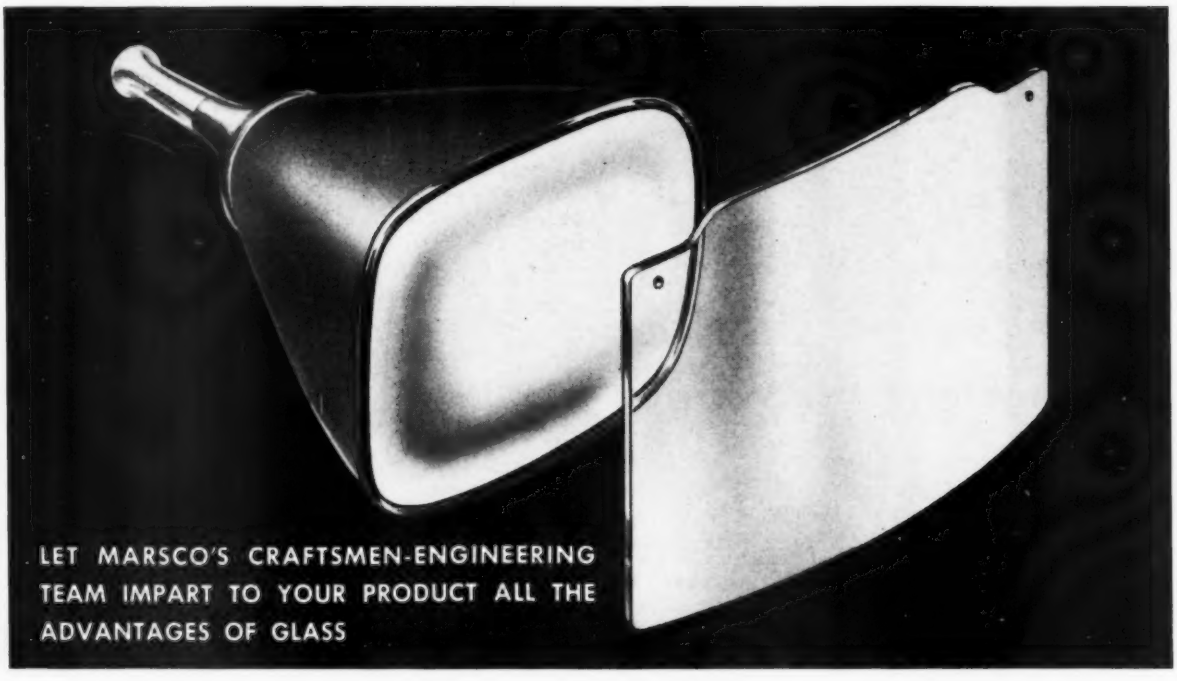

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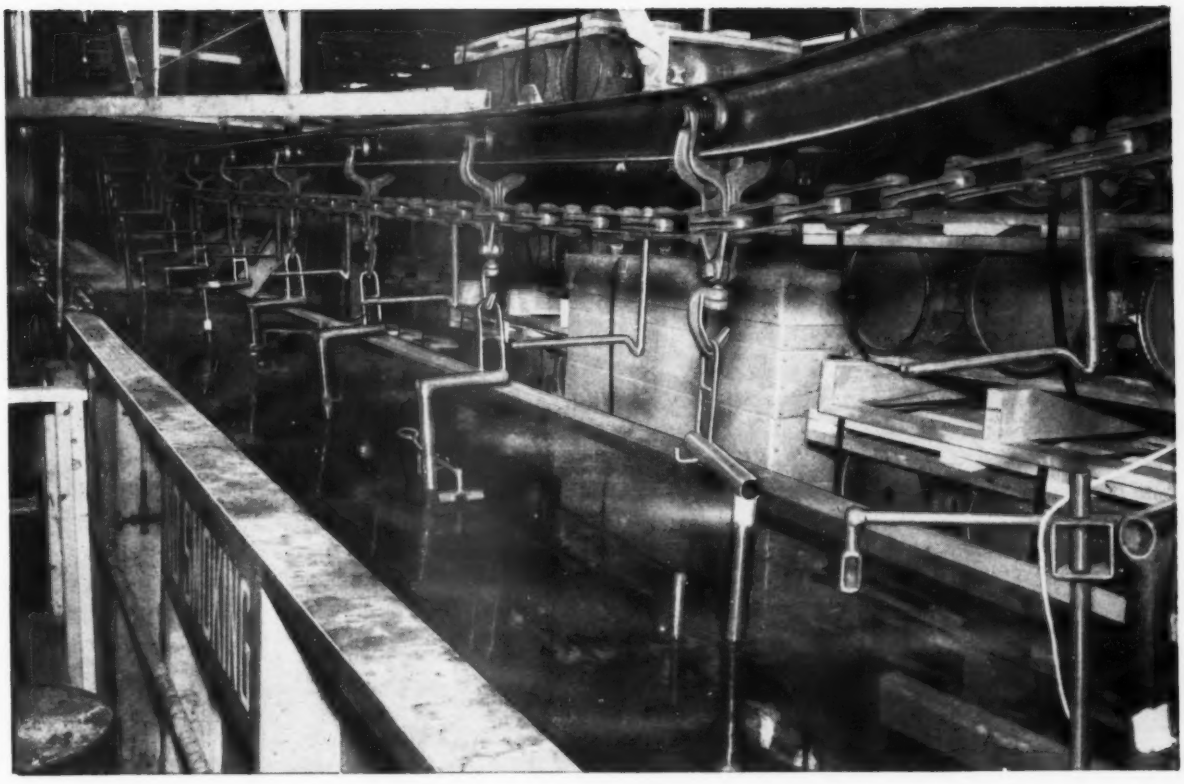

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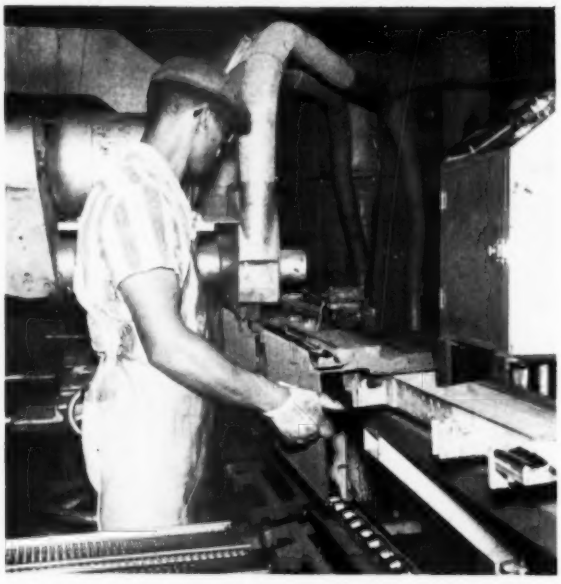


Exit end of buffing machine. A "polished and buffed-like" finish is imparted to the front moulding of refrigerator shelving prior to plating, assuring a highly-polished surface after zinc plating.

Plating wire shelving

well equipped plant has specially-designed eq ip-ment for manufacturing and plating wire prod cts

EXCLUSIVE MPM PHOTOS

USE OF PLATED WIRE shelving, baskets and similar wire components has grown considerably during recent months. One important reason is the substantial manufacturing progress made by the producers of these appliance components. Union Steel Products, Albion, Michigan, is one of these manufacturers. The company's operation has been constantly improved with the addition of many of the latest types of fabricating and plating equipment, including unique forming and welding set-ups that were designed by Union Steel engineers.

The plant is geared for what are called "short runs" of from 5,000 to 15,000 of one item at a time. Though these might seem like rather large numbers to term short runs, Union Steel runs the plant for plated wire products on this basis to derive the greatest efficiency from men and machines, on a multitude of different designs. All except the heavy presses are portable, enabling movement to a different line at any time. A number of small spot weldlers are semi-portable and can readily be moved short distances to implement small fabricating centers. Standard types and sizes of shelves number from 35,000 to 40,000 units on a single production run, and are stored subject to orders for smaller customer releases.

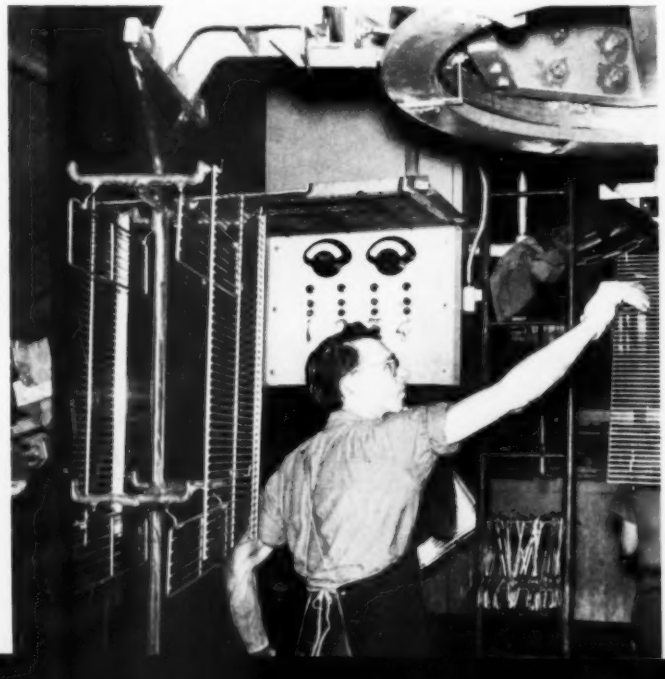
Two types wire stock used

Two separate plants, one for plated wire shelves, baskets, etc., and the other for the production of pallet-containers, carry their own stocks of wire. In Plant I, where wire shelves are made, 250-700 tons of coil wire is stocked in gauges of 1/16 to 7/16 inch diameter, while Plant IV keeps 180-450 tons of wire in gauges from 3/32 to 1/2 inch diameter. Two types of wire are utilized; one is extra bright for plating, and the other is basic mill run type.

100 per cent inspection

In Plant I, the subject of this article, all fabricated wire parts are subjected to 100 per cent inspection following fabrication. A double row of well-lighted inspection benches assures optimum conditions for the task. Inspection includes the removal of sharp points and gauging and visual inspection to locate loose welds or faulty fabrication.

Loading flat wire racks on the work carrier on the newest zinc plating machine. Specially-designed carriers were developed at Union Steel for this purpose.



Immediately after plating, racks are sent through a hydrogen relief process in A-type oven shown. Racks are moving upward into oven in this view.

Buff rack fronts before plating

The front moulding on shelving for refrigerators is buffed to a fine, satiny finish on a specially built machine, prior to being plated. The buffing machine handles two shelves per jig, and is equipped with 14 jigs mounted on an endless chain to handle all the various sizes and types of shelving utilizing a trim moulding. The buffing machine was built by Union Steel engineers, and has improved productivity 500 per cent over hand machines. Two buffing heads transform the cold rolled face of the front moulding to a stainless steel-like luster in a single pass. The two buffing heads use the same buffing compound, the first being a Sisal buff, and the second is a cotton buff which imparts a stainless steel satin apearance even before plating.

Five plating lines

In addition to three automatic plating machines, Plant I has two plating lines for special large parts, and one for handling short runs or unusual plating jobs. All five lines are located in the same area of the plant to provide economy in handling. Ninety percent of all work plated is received by this department via an overhead monorail conveyor from the manufacturing area.

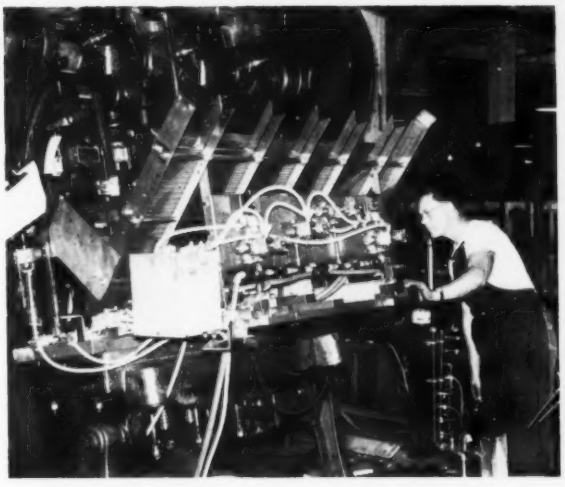
Three automatic machines

Steel wire shelving and baskets for ranges and refrigerators are plated with copper, nickel and chrome or bright zinc-chromate in a continuous, automatic process on three automatic plating machines.

to Page 56 →

Loading plating machine No. 1, designed to handle wire baskets as well as flat shelving. A single service conveyor carries the fabricated shelves down past all of the plating machines.

Feed end of bending press which automatically feeds wire to bending dies that can perform up to seven different bends at one time to each wire. The machine can be set up with dies to form four to twelve bends.



EXCLUSIVE MPM PHOTOS

Unique forming and welding machines fabricate wire appliance racks

specially designed, these machines make what used to be a tedious job into a faster, more efficient operation

TWO UNIQUE MACHINES used for bending and welding steel wire shelving for appliances are shown in the two photos on this page. The top photo is a view of the feed end of a bending press that automatically feeds wire to bending dies that can perform up to seven different bends at one time to each wire. The bottom photo shows a specially-designed resistance welder used for welding steel shelf wire to refrigerant-carrying serpentine tubing.

Special fabricating equipment

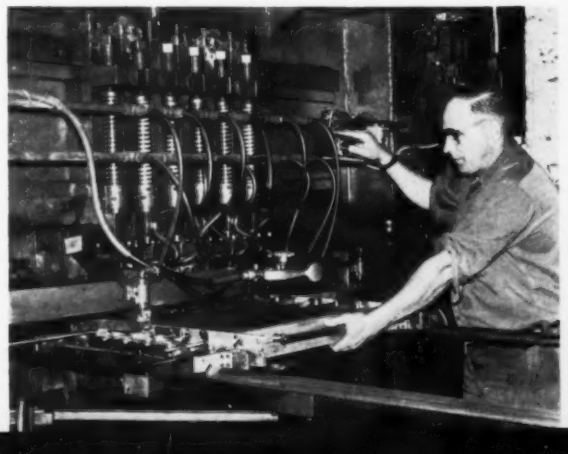
Practically all of the tools, jigs, and dies for bending, forming, and welding are made in Union Steel's own shop. Bending equipment is designed to put four to twelve bends on an individual piece, depending on its gauge. Hopper loading machines are designed to spot weld as many as forty wires, each at three to five intersections (an entire shelf) in a matter of seconds. The rate at which these machines can spot weld in a single pass is 180 to 225 cycles per minute.

One operator handles the complete operation on an individual setup for the forming and welding of a complete rack. One of the bending presses, to give a typical example, is equipped with a series of four air valves and cylinders, combined with a micro switch control system to control the press automatically. Both feeding and seven operations of bending and forming are handled on this machine before the part is transferred automatically from the press to a double end T-welder, with the frame made complete for cross wire welding in a single operation.

Special welder for refrigerated tube-carrying shelves

A large resistance welder was designed and built to weld cross wires to copper coated steel serpentine tubing for refrigerated shelves, such as used in upright freezers. After welding, each part is submerged in a water tank and tested with dry air at 350-lbs. pressure to detect possible air leaks which may have developed during complete fabrication.

Specially-designed resistance welder used for welding steel shelf wire to refrigerant-carrying serpentine tubing. Welder automatically welds at three places in a single pass over a wire shelf at a rate of 180 cycles per minute.



Plating wire shelving

→ *from Page 55*

The first of the three automatic machines (No. 1) is equipped to plate approximately 360 flat shelves per hour. It is an hydraulically operated machine that is equipped with a double clean, double pickle cycle in addition to the copper, nickel, chrome plating cycles. These same cleaning and pickling cycles are utilized on the two zinc plating machines (No. 2 and No. 3).

Following the 7½ minute copper plating cycle, the shelves are subjected to a double rinse acid dip, which prepares the work for nickel plate. Nickel plating is followed by two rinses; the chrome plating cycle is followed by three rinses.

The work from all plating machines is placed on a single conveyor, combined with the work from the hand lines, and passed through a 3½ minute dry off and hydrogen removal process in an oven maintained at 390°F. All of the plated work is then conveyed to a common inspection booth, where the unlacquered plated shelves and basket are sent to the shipping department and the remainder are sent through a lacquer coating process via conveyor. All refrigerator parts are clear lacquer coated. The parts are dipped in lacquer automatically, allowed sufficient time to flash-off, and then are baked for permanence, cooled for handling, all on a single continuous conveyor, and the finished parts removed by packers in the shipping area.

The second plating machine, built to the company's specifications, has a 10-minute zinc-plate cycle. The plating tank on this machine is of 6,500 gallons capacity. Plating is followed by a single rinse, then a nitric acid bright-dip and rinse. A chromate treatment comes next, followed by rinsing and then leaching. After a final warm water rinse, the work moves to the point where all of the work is placed on the single conveyor that carries the work through the hydrogen-removal baking process.

New mechanical plating machine

The third and newest automatic zinc plating machine was also made to Union Steel specfications. This mechanically-operated machine employs the same size tank as No. 2, 78 inches deep, 35 inches in the direction of travel, and 40 inches wide.

One of the features of this machine is the clear area above the top of the tanks. This is made possible by the removable work carriers being mounted on the rail at the extreme back side of the tank. The work carriers are fitted with offset or extension arms that carry the work racks over the center of the tanks.

Another advantageous feature is the contact between the work carrier and the cathode rail. This essentially is accomplished by a cantilever or lever action by the weight of the work on the carrier. The weight of carrier, rack, and work forces the contact shoe, which is mounted on the heel of the carrier, to make positive contact with the cathode rail. The machine is equipped with a full single-point lubrication system that eases maintenance, and is simple and easy to operate.

Use solvent-type emulsion cleaner

The first cleaning cycle on this machine employs a solvent type emulsion cleaner maintaned at 185° F.

From the full spray rinse station following the first cleaning, the work is immersed in a reverse current alkaline cleaner and then to a spray-over rinse cycle. A 50 per cent muriatic acid solution follows where the work is pickled at room temperature for about three minutes.

After another spray-over rinse, the work is dipped in a second reverse current cleaner designed to remove smut. Spray-over rinsing consists of injecting air into the fresh water inlet to create turbulence in an over flowing rinse tank, and a row of three or four fan-type sprays are carefully directed at the work as it is submerged or withdrawn. Automatic controls may be used to control flow of water as desired during any part of cycle.

Prior to zinc-plating, the work is dipped in another 50 per cent muriatic acid solution and two cycles of spray-over rinsing. This machine is equipped with a 7,500 gallon tank of cyanide zinc, followed by rinse, nitric acid, and chromate dips.

Plating controls

Daily checks of each of the cleaning and plating solutions is standard practice at Union Steel Products to maintain quality and keep production costs at a minimum. Each of the cleaner solutions is checked each morning to determine its concentration. A daily addition is made, based on the morning check, to maintain strength at effective levels.

When an acid bath becomes weak, it is dumped and replaced immediately. The zinc bath is analyzed for cyanide, caustic soda and zinc metal at least weekly. Brightener and purifier solutions are checked daily, depending on the rate of production being run. Daily additions are made to plating solutions based on past consumption rates with adjustments added at time of analysis.

The chromate bath is checked at least twice daily, and although automatic additions are made to the bath at four-hour intervals, rebalancing the bath is frequently necessary, based on laboratory analyses.

The nitric acid bright dip and leach baths are dumped and replaced each day. The plant operators have found that they can run a more continuous operation with a minimum of trouble by dumping and replacing the bath each day, and the costs for making these baths is nominal.

The company aims for a bright zinc-plating job that will withstand from 60 to 72 hours of a standard five per cent salt spray test with no corrosion occurring. Recently the company has come up with some close approaches to the 72-hour test on parts without the lacquer coating. With lacquer, the test is extended to 100 to 120 hours.

Lacquered parts move upward to an "A" type on-the-roof, gas-fired, infra-red type oven equipped with ceramic burners. The oven is a combined convection and radiant heat system. A flash-off period of 12 to 15 minutes, depending on the speed of the conveyor, is provided for before the lacquered parts enter the oven. Full dust control is provided for in the design of the baking system.

Average time of bake in the oven is about 26 minutes from an entrance temperature of 120° F. to 385° F. maximum. The first six minutes of baking goes from 120° to about 310° F. About five minutes of the last part of the bake is at 380° F. The baking schedule is carefully controlled to the most exacting requirements.

Westinghouse Introduces New Design Concept

Westinghouse has introduced a new design concept in its 1959 line of water coolers that is said to permit installation flush against a wall. The plumbing lines are brought out of the back of the cooler and connected to lines concealed in the wall.

"Our exclusive new 'Wall-Line' brings a brand new dimension to water cooler design. It is the answer to the requests expressed in our recent survey of over 1,800 of the nation's top architects and builders for a water cooler that would conserve space and conceal plumbing," said R. S. Sheetz manager of the Westinghouse water cooler department.

NEW INDUSTRIAL LITERATURE

Metal Preparation for Porcelain Enameling or Painting

A wide range of products for preparing metal surfaces prior to porcelain enameling and painting is supplied on request from the manufacturer. These products include spray cleaners, vat or tank cleaners, neutralizers, and phosphating compounds for steel, zinc or aluminum. Complete data on each of these compounds and how best to utilize them is available from Dept. 3064, Wyandotte Chemicals Corp., Wyandotte, Mich.

Fastener Recognition Bulletin

A simple fastener recognition bulletin eases the task of finding the face of a particular fastener, if the specification number of the item is known. The device works just as easily in reverse if the shape of the part is known and the number of the fastener is needed. The source of each fastener is listed, and in many instances minimum tensile or shear strengths are tabulated. For information write Special Projects Editor, MPM, York St. at Park Ave., Elmhurst, Illinois.

Overhead Conveyor Systems Catalog

The availability of a new 12 page catalog has been announced containing the latest information about overhead conveyor systems. This up-to-date issue contains typical installations and layouts together with complete engineering specifications. These overhead conveyors meet the demand for modern handling of any type of intermediate load in applications as varied as industry itself, according to the manufacturer. New catalogs are available on request from Dept. MPM Chainveyor Corporation, 5618 E. Washington Blvd., Los Angeles 22, Cal.

Free Phosphating Analysis Kit

A free kit is available to enable determinations of phosphating needs and how paint adhesion can be promoted in the process. The kit gives information on how phosphating can be fitted to individual cost and production requirements. If phosphating is being done the kit can be used to determine the efficiency and cost of the present process. For the free kit write Dept. MPM, Turco Products, Inc., 6135 So. Central Ave., Los Angeles 1, Cal.

Thermo-Setting Acrylic Enamel Book

Detailed information is contained in a free brochure on thermosetting acrylic enamels that can be applied in one coat on such products as air conditioners. Exceptional adhesion and resistance to corrosion and weathering are some of the properties claimed for the product. In addition, the finish reportedly is easy to work with and can be duplicated only by multiple coats of conventional baking enamel. It can be applied by a variety of high-speed methods even on difficult-to-finish parts. For the book write Dept. MPM, Pittsburgh Plate Glass Co., Industrial Finishes Div., 1 Gateway Center, Pittsburgh, Pa.

Data on Precipitation Hardening Stainless Steels

Facts on two types of precipitation hardening stainless steels are available in a new booklet. These steels are said to combine high strength at both room and elevated temperatures, excellent corrosion resistance, ease of fabrication, low temperature heat treatment and good resistance to stress corrosion. These two steels can be spun, drawn, formed, machined and welded using similar procedures as with the 18-8 stainless types. Send for the booklet "Engineering Properties, AM350 and AM355.", Dept. MG-15, Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22 Pa.

Shipping Containers and Services Illustrated in Catalog

A complete line of containers for every shipping purpose and the services that are available are illustrated in a free catalog. The full line of shipping containers covers every domestic and export type. Such products as appliances can be shipped in containers that combine safety, easy storage and protection. The types of containers available are: pallet boxes, wired and hinged; cleated boxes; cleated corrugated; wirebound crates, and boxes, corrugated; hinged corner crates or boxes. For the booklet write Dept. MPM, Chicago Mill and Lumber Co., 33 So. Clark St., Chicago 3, Ill.

Eight Finishes for Stainless Steel

Complete information on eight different finishes for stainless steel is available in an easy-to-obtain booklet. Some uses require unpolished surfaces especially where highly oxidizing or very corrosive atmospheres are combined with high temperatures. Others require polished surfaces when appearance, sanitation or easy cleaning comes first. These steels are available in a wide range of standard and special grades and in gages, sizes, and shapes to suit design needs. For more information write Dept. MPM, Armco Steel Corp., 1569 Curtis St., Middletown, O.

New Spray Painting Equipment Catalog

A new catalog featuring the latest spray painting equipment for contract, production and maintenance painting has been announced. The new catalog includes cup guns, multi-color sprays, (for enamels, etc., direct from original 1-5 gallon shipping pails), direct supply spray units, circulating paint systems and the airless type gun. In addition, there is a complete selection of spray painting accessories and hoses. Write for Powerflo Catalog "Section A", Dept. MPM, Gray Co., Inc., 326 Graco Square, San Francisco, Cal.

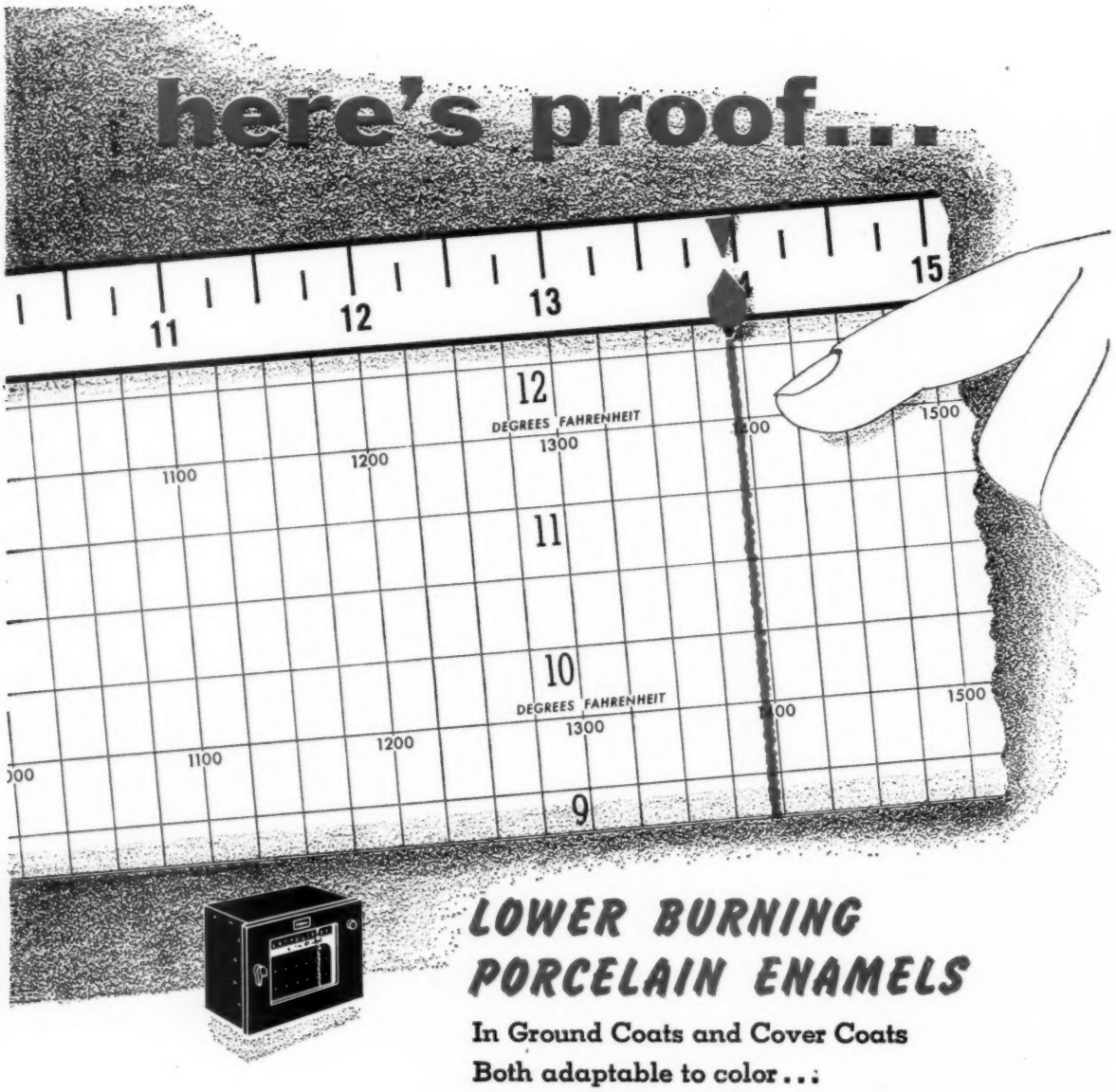
Thermostatic Element Lifts 250 Pounds

A booklet is available that describes a thermostatic control used in a variety of industries. The thermostatic element can reportedly lift up to a 250 pound load at temperatures from sub-zero to 450°F. Write to Dept. MPM, Detroit Controls Div., American Standard, 5900 Trumbull Ave., Detroit 8, Mich., and ask for bulletin No. 213-A.

Solenoids Catalog

A wide range of solenoids made to individual specifications feature close tolerance component parts that reportedly eliminate many problems in product assembly. These solenoids are made with double shading coils to deliver high seating pull without hammer or excessive A-C hum and chatter. The plunger's

to Page 61 →



LOWER BURNING PORCELAIN ENAMELS

In Ground Coats and Cover Coats
Both adaptable to color . . .

with NO SACRIFICE in QUALITY

AGAIN Ing-Rich "KNOW HOW" proves its high value to our Frit customers . . . the result of that rare combination of top flight ceramic engineers working hand in hand, day in and day out with practical technicians in our large job enameling plant.

When you think it through, we are sure you'll agree that it's mighty hard to beat the rare combination of the scientific approach PLUS practical "KNOW HOW". . . and . . . that's just what you get when you are an Ing-Rich Frit customer.

ING-RICH
FRIT
"The Plant Tested Frit"

INGRAM-RICHARDSON, INC.
OFFICES, LABORATORY AND PLANT
FRANKFORT, INDIANA

THE MPM spotlight

Frigidaire 1959 Frost-Proof refrigerator-freezer, 14.2 cubic foot capacity, features lacework styling on door and base panels, scientifically-designed storage facilities, and roll-out refrigerator shelves and freezer baskets. Built-in ejector and storage bin in freezer door assure supply of ice cubes. Colors are new Aztec copper, turquoise, charcoal gray, Mayfair pink, and sunny yellow, as well as white. All models with synthetic enamel finish are available with right or left-hand doors, and three models have exterior finish of white porcelain enamel.

Stainless steels

→ *from Page 32*

rapidly as the carbon steels, this fact requiring careful planning as to intermediate anneals so that stress cracking will not occur.

(3) The stainless steels have about twice the springback when compared to the carbon steels. Tools must therefore be designed for a greater amount of overbending to obtain the final shape.

(4) When polished sheets are used, proper protection during forming should be employed. The finish can be protected by the use of kraft paper that is pasted to the sheet; also, a plastic coating that can easily be peeled off when no longer required; or, the use of a transparent, non-whitening lacquer. Removal of these coatings is done after forming has been completed.

Brake Forming — Although the same procedures are used as compared to carbon steels, heavier tools are required. A good rule to follow in brake forming a specific gage of stainless is that the same forming procedure be used that is required to form hot-rolled carbon steel that is four gages heavier. In a bending operation, the tool stroke should be as short as possible to decrease the tendency to foul or score the tools. Clearance should be about 10 per cent more than the metal thickness. In addition, the dies should be given a high polish and must be free from all surface blemishes to prevent marring the finish during forming. Further protection will be realized by use of an adequate lubricant.

Roll Forming — Roll forming is a continuous process where the strip is progressively formed by driven rolls that are stationed in tandem. The annealed temper is widely used for forming; however, extensive roll forming on the harder tempers has been performed. In the latter case, the number of passes are increased with more gradual reductions to the final shape. The minimum bend radii recommended for both brake and roll forming the annealed temper is at one-half the thickness of the metal formed. The data given in Table 3 will give the recommended bend radii for the harder tempers. As in brake forming, polished rolls as well as the use of a lubricant are required.

Rubber Forming — This method of forming has become a useful tool in the forming of thin stainless sheet, stock up to 3/16 inches being formed with straight and curved flanges. An advantage of this process is the uniform pressure distribution exerted by the rubber pad which forces the metal around the contours of the form blocks. Where a wide press bed is used, several different formblocks can be used simultaneously to form corresponding parts. Radii used on formblocks are from one to one and one-half times the metal thickness, these formblocks being undercut to allow for springback. The rubber pad is soft and resilient which protects the stainless steel surface; it eliminates local distortion, and cold working of the metal is held to a minimum.

Die Forming — The annealed temper is used to a greater extent in die forming; the methods used being substantially the same as that used for the carbon steels with the exception of providing greater power to compensate for the higher strengths of the stainless steels. The harder tempers may be formed, provided certain precautions as to reduction, radii, etc., are observed. Thus, reductions are rather limited to shallow formed parts.

Drawing — The austenitic stainless steels are used quite extensively where severe forming operations are required, reductions up to 45 per cent being possible before a regenerative anneal is required. The ferritic stainless composition, type 430, is also frequently used; however, due to its lower ductility, the maximum reduction realized will be between 25 and 30 per cent. Where large reductions are required to obtain a completed part, a planned sequence of drawing and intermediate anneals is necessary. Since these materials will behave differently when compared to the carbon steels, the following suggestions are offered:—

(1) Due to the greater hardness of the stainless steels, tool wear will be higher, requiring a careful choice of tool material.

(2) Die clearance will vary with the stainless composition formed. In general, when compared to carbon steel, this value will be about double.

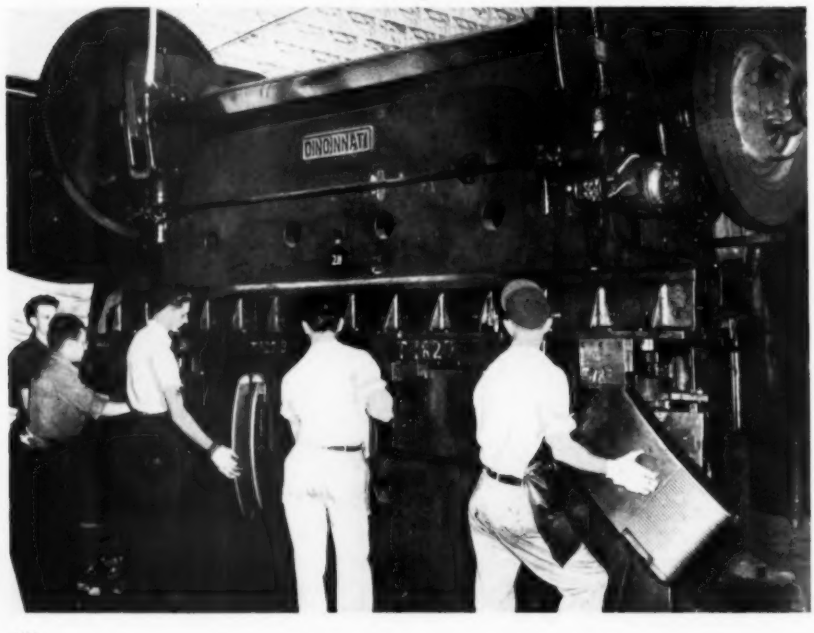
(3) To prevent breakage, the die radius should ordinarily be at a minimum of five times the metal thickness. If this value is more than ten times the metal thickness, flange wrinkling may occur. This can be prevented by using a higher holddown pressure; however, this lowers the reduction possible.

(4) The holddown pressure should be distributed evenly, and should be at the lowest value possible without causing wrinkling. Holddown with spring-loaded pads is satisfactory; however, better control is possible when a secondary set of cylinders is used on the press. Ejection of the part, rather than a push-through operation, is preferred.

(5) The drawing speed should be approximately 30 feet per minute.

(6) Lubrication is essential. This may vary from heavy-bodied and pigmented-type lubricants for deep drawing operations to soluble-type oils or thinned pigmented lubricant for milder forming operations.

Austenitic stainless steel lends itself quite well to press brake forming.



NEXT MONTH

SECOND, AND CONCLUDING, PART OF

Fabrication of the Stainless Steels

New Literature

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stroke is phase-timed for maximum work and eliminates any power drop-off. For a catalog on these solenoids write Dept. MPM, Dormeyer Industries, 3436 Milwaukee Ave., Chicago 41, Ill.

Dry Powder Vinyl Finishes

Specially processed dry powder vinyl finishes are described in a new bulletin. These powders are formulated for use in the patented fluidized bed coating process. Especially suitable for wire racks as used in dishwashers, the finishes can be applied heavily (0.010″ to 0.032″) in a single dip, without solvents. The surface is said to have outstanding color and gloss retention, extreme toughness, and excellent resistance to corrosion and chemicals. For information write for the new Corvel bulletin, Dept. MPM, National Polymer Products, Inc., Reading, Pa.

Plan Book of Metal Mouldings

Plan Book of Metal Mouldings for all products in all metals from a specialist in stainless steel is available in a well-illustrated booket. Rings for washers, bezels for television, dinette trim and aprons, refrigerator kick plates and escutcheons are some of the many mouldings that can be made. For the booklet write Dept. MPM, Pyramid Mouldings, Inc., 5364 W. Armstrong Ave., Chicago 30, Ill.

Perforated Metals Versatile Design Tool

Perforated metals have been incorporated into today's products with ideas that have proven themselves. A booklet is available which describes "Perforated Metals for Every Purpose" and is based on ideas gained through 89 years of experience as specialists in the use of perforated metals. For a free copy write Dept. MPM, Charles Mundt & Sons, 55 Fairmount Ave., Jersey City 4, N. J.

Zinc-Coated Surface Defies Corrosion

According to a manufacturer using zinc-coated steel, the surface defies corrosion and takes paint beautifully. This leading manufacturer of housewares, such as kitchen canister sets and bread boxes, finds that electrolytic zinc-coated steel is a natural for its purposes. A free booklet completely describes how this electrolytically-fused zinc coating is so tight that not even the severest bending, drawing or crimping operation will flake or peel off its surface during fabrication. For the free booklet entitled "Weirzin", write Dept. R-19, Weirton Steel Co., Weirton, W. Va.

Informative Booklet on Galvanized Sheet

washers, flow coat systems are a few of the claims made in a booklet which describes steel that is available in coils or cut lengths up to 60″ in width, and gauges 8 to 30 inclusive. This zinc-coating is said to resist flaking under the toughest conditions. The coating stretches with the base metal during fabrication, according to the manufacturer. For a free booklet describing this sheet, write Dept. MPM, Inland Steel Co., 30 W. Monroe St., Chicago 3, Ill.

New Fractional H. P. Motor Catalog

A newly revised and enlarged "Smooth Power" fractional H. P. motor catalog is now ready for distribution. It contains illustrations, descriptions, and specifications of eight basic motors, and a total of 36 model variations, ranging from 1/1800 to 1/35 H. P. A new model motor is described in the booklet that is especialy designed for applications requiring unusually long service life, according to the manufacturer. It features extra large oil reservoirs, die-cast bearing brackets, and a new method of packing the wicking to insure equal oil distribution at al times under rugged service it is said. Copies of the new catalog can be obtained by writing Dept. MPM, The General Industries Co., Elyria, O.

Sink Frame Handbook

A new handbook, reportedly the only one of its kind, gives 50 reference tables showing which decorative, sealing frame to order for 1,062 different sinks and lavatories manufactured in the industry. Other pertinent information is included also.

This booklet can be used by fixture-makers to order a frame that combines sealing ability with the latest in style. For the free booklet write Dept. MPM, Walter E. Selck and Co., 225 West Hubbard St., Chicago 10, Ill.

Irradiant Grid Flameless Gas Burner Brochure

In a typical installation of an irradiant grid flameless gas burning system, the oven is installed above roof level. It provides a combined radiant-convection bake for synthetic coatings, in a dust free atmosphere. A complete brochure is available that describes, generally, how complete finishing and metal preparation systems can be engineered to fit a specific set of requirements. Ovens, furnaces, spray booths, parts washers, flow coat systems are a few of the custom engineered facilities that can be installed. Write for a brochure from Dept. MPM, Granco, Inc., 317 32nd St., S. W., Grand Rapids, Mich.

High Frequency Heating Units for Brazing, Soldering

A free catalog is available on high frequency induction heating units that are used for brazing, soldering, melting and annealing. These units feature mechanical drive systems with continuously variable up, down and rotational speeds, all independently controlled. Continuous water cooling for the outside of the quartz tube during operation and assembly and disassembly of the systems are further features. For the catalog write Dept. MPM, Lepel High Frequency Laboratories, Inc., 55th St. and 37th Ave., Woodside 77, N. J.

Paint Pump Catalog

A full 5.4 horsepower paint pump, reportedly more powerful than any other paint pump on the market, is fully described in a newly available catalog. The new pump is constructed to assure faster, more efficient delivery through long lines and numerous outlets, according to the manufacturer. These pumps deliver from .4 to .65 gallons of paint per cycle and can serve up to 2 miles of piping. They can handle all kinds of finishing materials, including fast settling acrylic lacquers. For the catalog, write Dept. MPM, Alemite Div., Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Illinois.

End Uses of Zinc Die Castings

A new and completely-revised edition of "The end uses of zinc die castings" is now available.

The 64-page book contains 192 photographs. It shows current examples of the applications for household appliances, business equipment and machines, coin-operated machines, television, automotive, hardware, plumbing accessories, industrial equipment, and other miscellaneous products.

MPM will procure your free copy for you if you will write on company letterhead to Special Projects Editor, METAL PRODUCTS MANUFACTURING, York St. at Park Ave., Elmhurst, Ill.

Bonding vinyl to metal

→ *from Page 28*

one-half millimeter in thickness.

The sheets are fed by hand into the coater and then move on a lay down conveyor into a 40-foot gas-fired oven. The oven is divided into two zones, the first of which is used to flash off the solvent. A temperature of 250° F. is maintained to the midway point of the oven. The next zone in the oven is kept at 390° F. to activate the adhesive. Careful control of the surface temperature of the sheet is essential (± 10° F.) to make a good bond.

As the hot sheet emerges from the oven, it is brought into contact with the vinyl by means of rubber rolls and immediately subjected to a pressure of 80 pounds. After passing through the bonding rolls, the sheet is sprayed on both sides with cold water. This is done to accelerate cooling and promote emboss retention of the vinyl film.

Bonding pressure is applied only when a sheet is moving between the rolls. An interval of about two to three inches is left between each sheet and, when this occurs, the operator momentarily releases the pressure between the rolls.

The applied vinyl film is slightly larger than the metal sheet and, therefore, needs to be trimmed. Trimming is done manually with a knife.

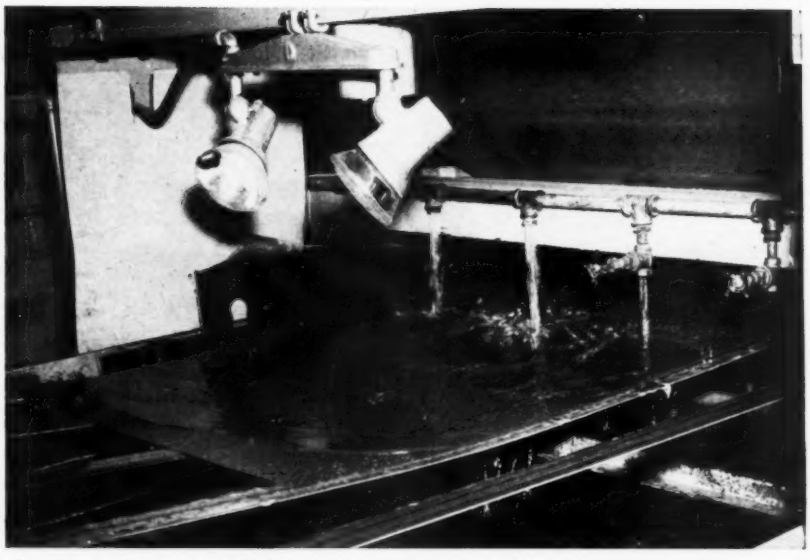
When the sheets are completed, an inspector carefully checks the vinyl surface for imperfections of any kind. Now the sheets are ready for shipment or a period of brief storage before the underside is painted. The sheet used in the plant for furniture is painted on the other side merely by cleaning the application rolls with solvent and roll coating the paint onto the sheet and baking it.

Blank and form on five-press line

Table tops are blanked and drawn in a compound die with the vinyl side up. Drawing compound is applied to corners of the painted side of the sheet. In two operations, the edges are pre-curled and then finish-curled with the vinyl side down.

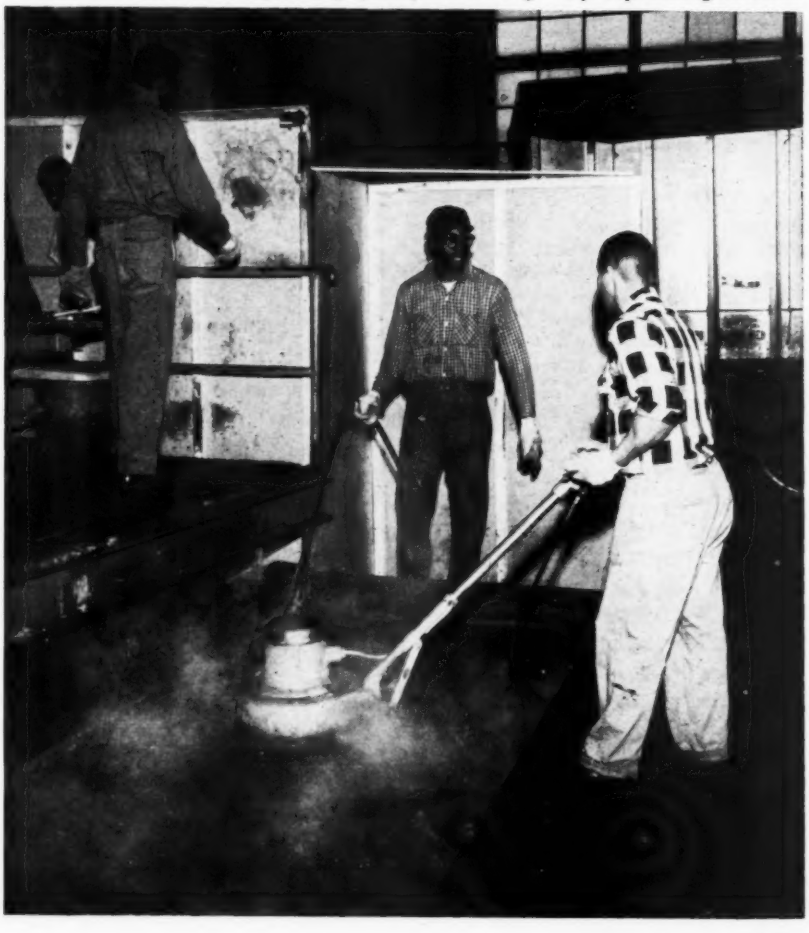
A five-press operation draws, pinch-trims, pre-curls, finish-curls and pierces chair seats. The same dies are used to blank and draw raw stock. The only requirement for these dies is that they must be kept clean. No special handling is necessary for vinyl-clad sheets during forming. The parts are transferred from press to press in steel chutes with the vinyl side down.

A similar bonding process is used by Shwayder Bros. in their luggage plant in Denver.



Quenching the laminated sheet with water. This is done to promote emboss retention in the vinyl sheet, and cool the laminated sheet for handling.

Steel wool is used to mechanically pre-clean steel before it is sent through metal preparation. Traces of carbon must be removed from side to be bonded with vinyl film to insure good adhesion. An auxiliary cleaning solution is flowed over the sheet and allowed to drain away immediately. Operator at left takes sheet and loads it on conveyor moving through five-cycle cleaning and phosphatizing machine.



New automatic washer

→ *from Page 36*

the basket. This glass enables the user to see into the basket when the door is closed.

Door hinges are so designed that the door can swing back a full 125 degrees where it is well out of the way when clothes are loaded and removed. There is, of course, a safety switch that shuts off electric current and stops basket rotation if the door is opened during any part of the cycle.

Highly important in a machine of this type is the matter of controls. Because of the varying jobs the machine must perform on fabrics of different types, controls have to be rather complex in themselves, but our engineers sought to make them as simple as possible for the user. This is accomplished by using two separate but interconnected control units, Fig. 6, each having its own dial. On these, the user sets the type and length of cycle to suit the nature of the

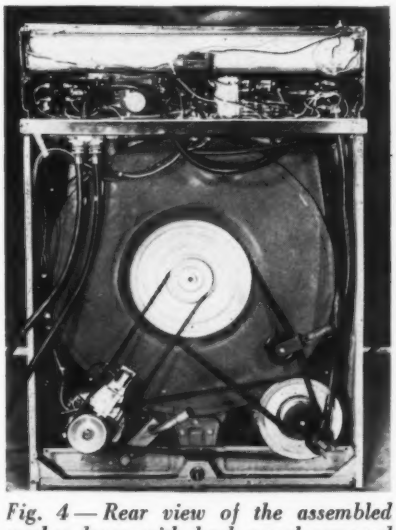


Fig. 4 — Rear view of the assembled washer-dryer with back panel removed to expose the belt driving system for the fan and cylinder from the motor at lower left. Above are control units with their wiring exposed.

load and what is to be done with it, first in washing and second in drying.

There is also a separate control, operated by a small knob, by which the user can select the water temperature (cold, warm, or hot) to suit the fabrics being washed. In setting the wash dial, the operator chooses either a "normal" or a "gentle" cycle, and can also control the length of the cycle. This may include special pre-soak and pre-wash for badly soiled loads. In a "normal" cycle there may be two to 12 minutes of suds washing and 11 minutes of tumble, spray and

to Page 67 →

GENERAL INDUSTRIES

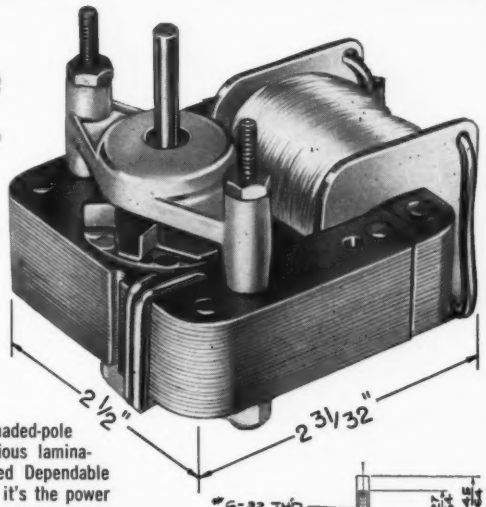
Smooth Power

AC MOTORS

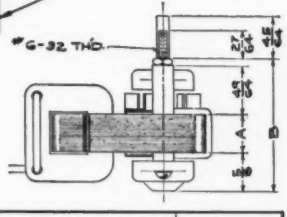
1/1800 H. P. TO 1/35 H. P.

Performance Proven . . . . .

Specify G.I. to be sure! Nearly half a century of experience in solving the motor problems of large and small motor users throughout the world is your guarantee of satisfaction.



Model "A" Two-pole, shaded-pole motor available in various lamination thicknesses. Proved Dependable millions of times over, it's the power choice of the nation's great-name manufacturers . . . setting an amazing performance record in countless applications from phonographs to kitchen fans to pumps. If dependability is your aim, Model "A" is your motor!

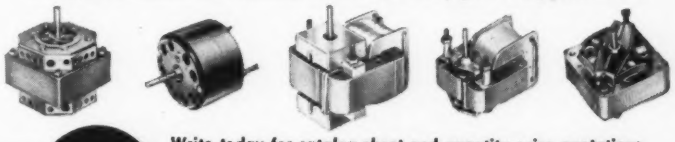


MODEL	HP 3600 RPM	LOCKED TORQUE in./oz.	MAXIMUM TORQUE in./oz.	FREE SPEED RPM	AMPS FREE	WATTS FREE	A	B
A-3-CW A-3-CCW	1/500	0.7	1.1	3360	.275	10	3/8"	1 7/8"
A-4-CW A-4-CCW	1/350	1.0	1.4	3380	.375	14	1/2"	2"
A-5-CW A-5-CCW	1/180	1.7	2.7	3430	.460	17	5/8"	2 1/8"
A-6-CW A-6-CCW	1/130	1.9	3.3	3430	.500	19	3/4"	2 1/4"
A-7-CW A-7-CCW	1/100	2.1	3.8	3500	.530	20	7/8"	2 3/8"
A-8-CW A-8-CCW	1/90	2.5	4.5	3480	.550	23	1"	2 1/2"
A-9-CW A-9-CCW	1/70	2.7	5.3	3520	.620	27	1 1/8"	2 5/8"
A-12-CW A-12-CCW	1/60	3.0	6.5	3500	.720	28	1 1/2"	3"
A-14-CW A-14-CCW	1/50	3.1	7.0	3490	.730	33	1 3/4"	3 1/4"
A-16-CW A-16-CCW	1/45	4.0	7.5	3490	.730	39	2"	3 1/2"

Standard Shaft Diameter .1817

1/4" Diameter Shaft Available If Required

Designs to Meet the Needs of a Wide Range of Applications



Write today for catalog sheet and quantity-price quotations.

THE GENERAL INDUSTRIES CO.

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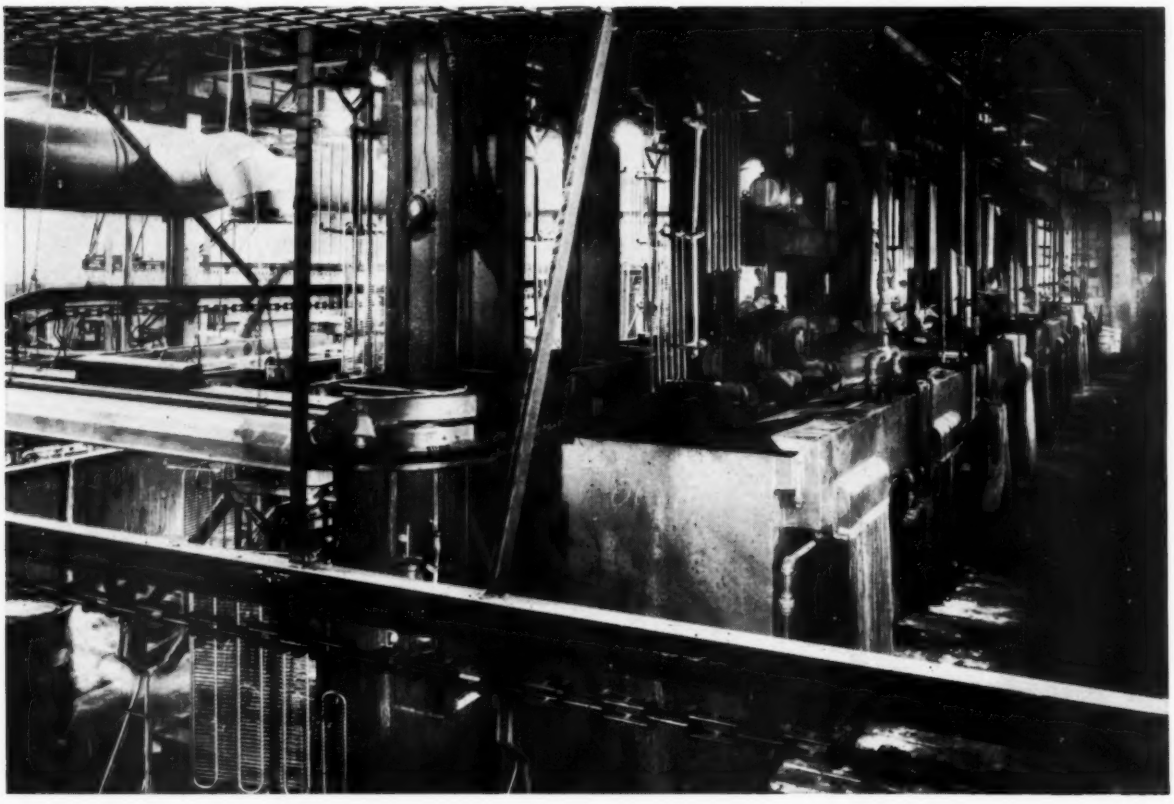


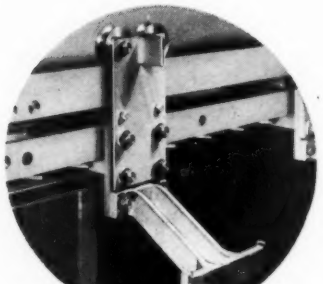
New MEAKER "Uniline" plating machine steps up production at UNION STEEL

A REAL WORKHORSE . . .

That's what **Union Steel's** production and engineering department says about their **new Meaker "Uniline" machine.** Presently, the machine is zinc plating evaporator shelves for refrigerator units at a driving **rate of 350 pieces per hour . . . 23 hours a day . . . seven days a week.** The Meaker "Uniline" machine has been at this steady grind since its installation . . . and with **no downtime** at all as has been experienced with adjacent machines of other makes.

STRUCTURAL SOUNDNESS AND SIMPLICITY . . .

These two factors are a prime requisite in any Meaker machine, spelling **dollar savings** plus superior **controlled quality** and **increased production.** "Meaker" is the keyword to better plating. Remember . . . before you buy just any machine, ask men like **Mr. Ray Marshall** at **Union Steel** why he **says that the next machine he buys will be another Meaker** . . . then decide on the best . . . Meaker, the name that stands for fine equipment, superior engineering, **plus** service.



THE CARRIERS . . . Full rackload is carried on steel rollers with permanently lubricated bearings. Electrical contacts on the carriers are positive in action due to constant load pressure and are easy and inexpensive to maintain. Current path from cathode rail to rack is short, minimizing voltage loss.

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MEAKER
METAL FINISHING EQUIPMENT

THE MEAKER COMPANY
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Wanted -colors, built-in appliances, plumbing ware and larger homes

brief comments from the Congress On Better Living sponsored by McCall's

ONE HUNDRED HOMEMAKER delegates from every state in the union were in attendance recently at McCall's 1958 "Congress on Better Living" held in Washington, D. C. Comments based on discussion at the three-day Congress, where women stated what they like and don't like about their homes and appliances and other home products, will be of interest to MPM readers.

Warm-air heat most popular

Warm air was voted the most popular type of heating in a home — the choice of 50 per cent of the delegates. Six out of ten delegates selected gas as the most popular fuel. Rockwool and glass fiber were preferred as insulating materials. Central air conditioning in the home is the desire of six out of ten delegates, and only 50 per cent indicated their new homes would have basements.

Colored bathroom fixtures favored

The plumbing industry, strongly criticized by delegates to last year's Better Living Congress, got a vote of reassurance from this year's group who sent out a plea to them for more baths, bigger baths, more colorful and imaginative bathrooms.

Most of the delegates want two bathrooms, while some said they would be satisfied with a bath and a half. But, no matter what the quantity, American women want their bathrooms of the future to be larger.

Colored bathroom fixtures were favored by most of the homemaking leaders. Choices ranged from beige to blue with several women saying they would be interested in color combinations.

Refrigerators, ovens and dishwashers

The delegates had a word for manufacturers on refrigerators. They complained of protruding door handles and of poor plastic fixtures. Their biggest problem here is to make a refrigerator fit into a desirable space in the kitchen.

The homemakers said built-in ovens have no adjacent work counter and do not provide space for a rotisserie, meat thermometer, and other necessary cooking aids. Ease of cleaning is an important factor in the selection of an oven, the delegates said.

When asked what built-in kitchen equipment they plan to acquire, the delegates ranked a dishwasher first, then an oven, followed by a counter top cooking surface and a refrigerator.

If it comes to a decision between a larger house which is not fitted with *built-in* appliances or a smaller, fully equipped house, 50 per cent of the delegates choose the larger house.

Now is the time to buy

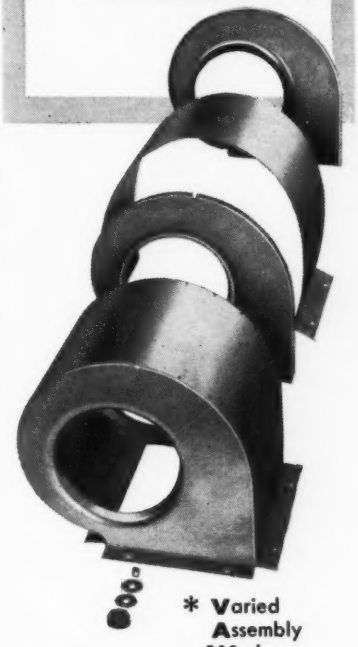
In a discussion on appliances, the women indicated that price is not considered a prime factor when they purchase an appliance. Instead, they look to the features that will speed their work. This attitude on price is the result of increasing confidence on the part of the delegates that the recession is over — at least in most parts of the country. *They feel that 'Now is the time to buy' major appliances* — the purchase of which many of them had been putting off because of the economic situation. The vote to buy appliances *now* was cast by 72 per cent of the delegates.

The average delegate

The 100 homemaker delegates to McCall's 1958 Congress on Better Living have a median age of 32 years, with a median income of $8,500 per year. 95 per cent of the delegates own their own homes, three-quarters of them have lived in their present homes less than five years. 53 per cent of them live in suburban areas, 33 per cent urban, 14 per cent rural. Eight of the delegates hold full-time jobs; 17 work part-time.

from blowers to bobbins...

take advantage of VAW*!



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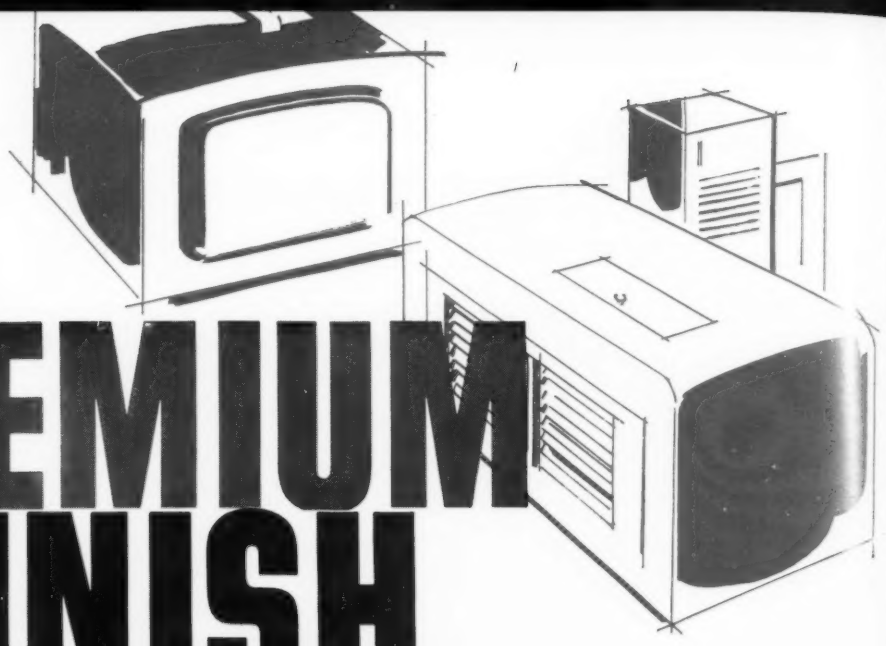
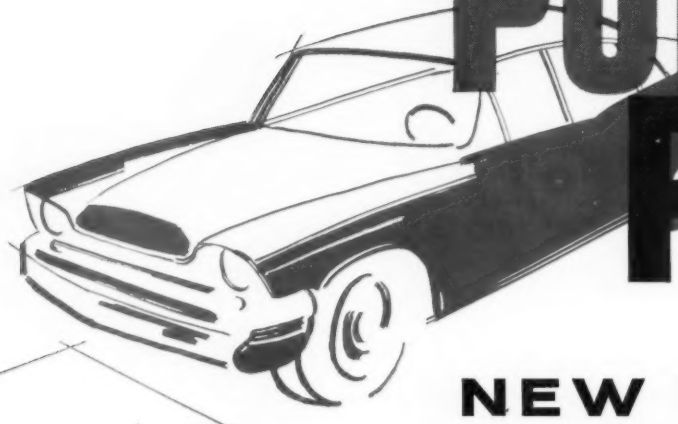


PREMIUM FINISH POPULAR PRICE



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NOW you can give your product a QUALITY finish without damage to your own profit margin. A scientific breakthrough in coating resin technology brings you new VITRILAN LC, a versatile organic baking enamel with premium quality at a popular price.

VITRILAN LC surpasses the best melamine-alkyds in resistance to humidity and corrosion and at least equals them in durability, hardness, toughness, color and color retention.

For resistance to soaps, mild alkalies and detergents it equals the high priced acrylics costing much more per gallon.

ONE COAT OVER PHOSPHATISED METAL will equal the performance of many 2-coat systems and is entirely adequate for most end uses. Flow coat, spray or dip. Bakes at conventional schedules.

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Headquarters Office: 224 McWhorter St., Newark 5, N.J. • Factories: Chicago, Ill. Cincinnati, Ohio. Elizabeth, N.J. Los Angeles, Cal. Newark, N.J. Mexico City, Mex. In Canada, this product is made by Aulcraft Paints Limited, Toronto, Ontario, and sold under its trademark. • *VITRILAN LC is a trademark of Interchemical Corporation.

New automatic washer

→ *from Page 63*

deep water rinsing. In the "gentle" cycle, there may be two to four minutes of suds washing and nine minutes of spray and deep water rinsing.

Drying cycle choices

Choice of several different drying cycles is possible assuming that drying is required (wash alone can be performed if desired): 1— Automatic full dry, large load; 2— Automatic full dry, small load; and 3— Automatic full dry "gentle" cycle, automatic low heat. Time and temperature limits may be set. Cycle time may be ten to 110 minutes in either "normal" or "gentle" cycles, making possible any degree of dryness from damp to full dry. If an automatic full dry cycle is chosen, drying continues until completed, but the user can stop the machine and remove the load at any desired time. A four-minute cool off period is provided following heating.

Because of the large cylinder, with well-designed baffles that constantly shift the load, the combination of deep water tumble rinsing, spray tumble rinsing with clean water, and spray water spin rinsing, exceptionaly clean washing is attained, and clothes are lint free.

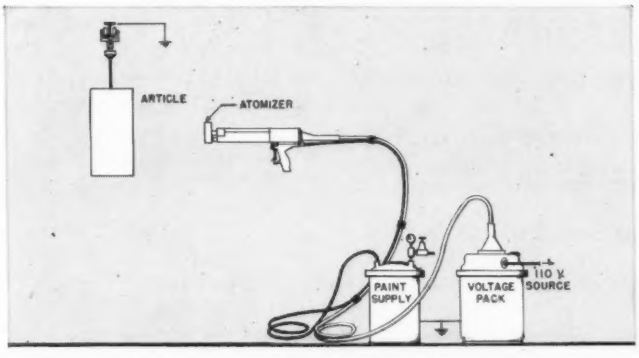
Manual presetting automatic control dials and washing and drying indicator lights are on an inclined panel above the main housing and below a fluorescent light having its own on-off switch. Back of the panel, and not seen by the user, are the main control units, each having its own removable driving motor and timing elements. Location of these controls is shown in the drawing, Fig 6, in which the heater relay switch and water mixing valve also appear. A removable back panel encloses controls.

Safety devices

Safety devices not already mentioned include: 1— An automatic water level control that provides correct water level regardless of load; 2— Two control thermostats that prevent excessive temperatures during drying cycles; 3— An additional safety thermostat to avoid overheating in the event of malfunction; 4— A motor centrifugal switch that shuts off heaters in the case of motor failure; 5— A built in and self-resetting motor overload protector; 6— A water-safe control to prevent spinning if water level in the tank is too high, and to prevent additional water being fed if malfunction in draining occurs; 7— A suds overflow to let excessive suds escape; and 8— Approved syphon breakers to meet plumbing requirements.

Here it is—— The PAINTING TOOL ALL Industry has been waiting for!

The NEW RANSBURG NO. 2 PROCESS ELECTROSTATIC HAND GUN



CUTS PAINTING COSTS!

Saves Paint because there's no waste. Now, for the first time, the high efficiency of Ransburg's No. 2 Process automatic equipment is available to you in the NEW Electrostatic Hand Gun.

Saves Labor, Increases Production because it is faster on many types of articles such as those fabricated from perforated and expanded metals, tubing, rod and wire. This is due to the "wrap-around" nature of electro-spray which paints ALL sides of such articles from one side only.

Saves in Equipment because no conventional spray booth is required—no water-wash, no sludge recovery! Uses no compressed air for atomization.

Saves Building Heat Loss because only mild ventilation for removal of solvent vapors is necessary, and . . .

Maintenance Costs Are Cut because clean-up and maintenance labor is only a fraction of that required by other, less efficient painting methods.

See how YOU can save in your own finishing department, and at the same time, improve the quality of the work. Write for literature and information showing how the Electrostatic Hand Gun has been proven on different products in a variety of industrial plants.

Call or write

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Box-23122, Indianapolis 23, Indiana

METAL PRODUCTS STATISTICS

a current report on available production, shipment and sales figures for important products in the appliance and fabricated metal products manufacturing field

		1958 (Units)	1957 (Units)	% Change
Gas Water Heaters	December	209,300	172,800	+21.1
	Jan.-Dec.	2,675,000	2,532,300	+ 5.6
Gas Ranges, Built-In	December	24,600	16,600	+48.8
	Jan.-Dec.	231,800	197,200	+17.5
Gas Ranges, Free-Standing	December	159,800	119,200	+34.1
	Jan.-Dec.	1,668,300	1,771,400	- 5.8
Gas Furnaces	December	62,300	38,700	+61.0
	Jan.-Dec.	850,500	703,200	+20.9
Gas Fired Boilers	December	7,000	5,300	+32.0
	Jan.-Dec.	121,900	105,400	+15.6
Gas Conversion Burners	December	7,500	6,900	+ 8.7
	Jan.-Dec.	148,600	163,500	- 9.1
Electric Refrigerators	December	286,900	214,600	+33.7
	Jan.-Dec.	3,116,700	3,350,000	- 7.0
Electric Freezers	December	65,600	47,400	+38.5
	Jan.-Dec.	1,100,900	925,000	+19.1
Electric Ranges, Free-Standing	December	84,300	77,000	+ 9.5
	Jan.-Dec.	810,100	940,000	-13.8
Electric Ranges, Built-In	December	59,600	36,800	+62.0
	Jan.-Dec.	544,400	425,000	+28.1
Electric Storage Water Heaters	December	65,600	60,500	+ 8.4
	Jan.-Dec.	823,500	800,000	+ 2.9
Electric Dishwashers	December	55,500	29,900	+86.0
	Jan.-Dec.	425,000	390,000	+ 9.0
Electric Food Waste Disposers	December	67,900	55,300	+22.8
	Jan.-Dec.	616,500	550,000	+12.1
Combination Washer-Dryer	December	21,662	12,026	+80.0
	Jan.-Dec.	168,375	179,268	- 6.0
Washers, Automatic & Semi	December	268,049	161,283	+66.0
	Jan.-Dec.	2,781,038	2,781,813	- 0
Washers, Wringer & Others	December	62,471	52,202	+20.0
	Jan.-Dec.	891,311	902,836	- 1.0
Electric Dryers	December	100,726	85,304	+18.0
	Jan.-Dec.	823,522	881,028	- 7.0
Gas Dryers	December	47,944	33,981	+41.0
	Jan.-Dec.	378,676	394,825	- 4.0
Vacuum Cleaners	December	316,965	237,501	+33.5
	Jan.-Dec.	3,295,047	3,190,172	+ 3.3
Metal Furniture	December	*	*	+26.0
	Jan.-Dec.	*	*	+ 1.0
†Television	November	437,772	574,646	-22.9
	Jan.-Nov.	4,505,578	5,825,804	-22.7
†Radio	November	1,545,606	1,688,868	- 8.5
	Jan.-Nov.	11,051,499	13,634,402	-19.0
Compressor Bodies	October	230,329	202,192	+13.9
	Jan.-Oct.	3,045,847	3,536,363	-13.2
Steel Barrels & Drums	November	2,419,099	2,592,571	- 6.7
	Jan.-Nov.	28,979,515	33,301,990	-13.0
Steel Pails	November	4,992,050	4,943,507	- 1.0
	Jan.-Nov.	67,290,054	69,235,275	- 2.8
Typewriters	December	109,730	*	*
	Jan.-Dec.	1,233,313	*	*

* Not Reported
† Output

Sources for this information: Gas Appliance Manufacturers Association, National Electrical Manufacturers Association, American Home Laundry Manufacturers Association, Vacuum Cleaner Manufacturers Association, National Association of Furniture Manufacturers, Electronic Industries Association, Air-Conditioning and Refrigeration Institute, and U.S. Dept. of Commerce.

Hot spray

→ *from Page 40*

cosity to 1 minute 55 seconds Zahn No. 2 at 78° F.

78° F.	1 minute 55 seconds	Zahn No. 2
120° F.	45 seconds	Zahn No. 2
140° F.	32 seconds	Zahn No. 2
150° F.	27 seconds	Zahn No. 2
160° F.	23 seconds	Zahn No. 2
*165° F.	22 seconds	Zahn No. 2
170° F.	20 seconds	Zahn No. 2
180° F.	19 seconds	Zahn No. 2

* Following the paint manufacturer's recommendation's, the paint was heated to 165° F. and applied as follows: Using the same gun, two coats were required to apply a 2½-mil coating with complete hiding power over an unprimed sheet metal panel 2 ft. x 4 ft.

Pressure used: 30 lbs. atomizing pressure at gun; 8 lbs. fluid pressure (16 oz. per min.) at gun.

Use less solvent

A typical example of the effect of increasing the ratio of solvent to material is shown in Figure 2. This is the same paint as shown in Fig. 1, but the viscosity test is not the same (No. 4 Ford Cup in Fig. 1 & 3 and No. 2 Zahn cup in Fig. 2). Figure 2 is a good example of the reduction in the amount of thinner to achieve a desired viscosity.

Almost all types of paints have been and are being used with hot spray, and these are: alkyds, amine alkyds, vinyls, phenolics, chlorinated rubber, catalyzed epoxies, epoxy esters, and oil paints.

Another approach

One method of approach that is strongly advocated by one of the major equipment manufacturers is represented by the following outline:

The starting point that has reportedly been very successful is to use the customers' normal material, reduced for

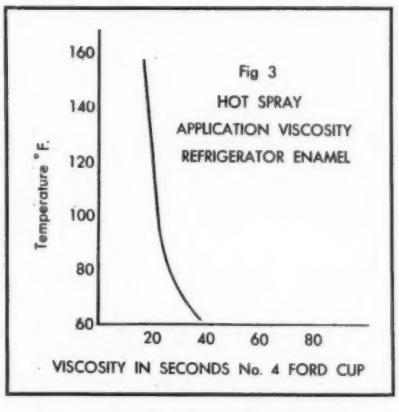


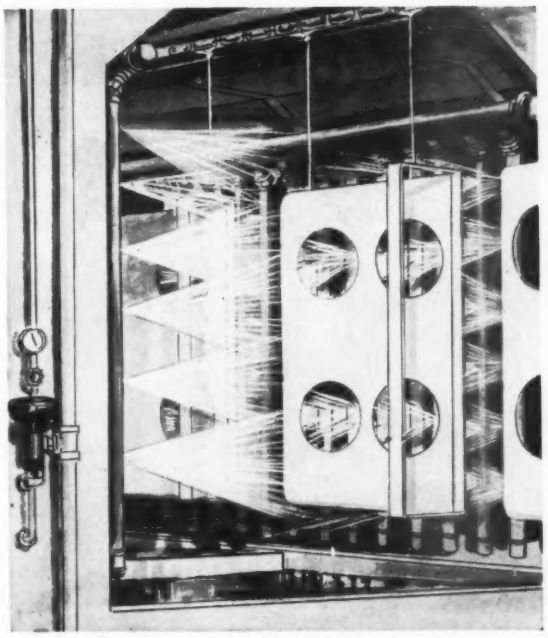
Fig 3
HOT SPRAY
APPLICATION VISCOSITY
REFRIGERATOR ENAMEL

cold spray application. Heat is then adjusted to the 140° F. range, the atomization pressure considerably reduced to increase the film build on the work, and reduce the material by-pass into the

to Page 86 →

Want flawless finishes?

Standardize on Wyandotte for preparation!

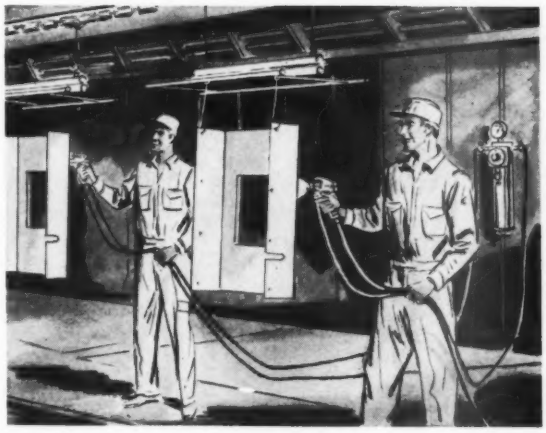


In your vitreous-enameling department:

Insure efficiency with Expray 541. Heavy-duty spray cleaner for all drawing compounds. Nonfoaming, long life, stands up under heavy soil loads.

Lower your costs with W.L.G.®. The industry leader for heavy-duty vat cleaning. It will remove even the toughest soil deposits in less time than ordinary cleaners. And W.L.G. will lower your costs, since there is less frequent dumping. Its effectiveness has been proven again and again in hundreds of plants. W.L.G. has established itself as a favorite everywhere.

Get tightly bonded with vitreous enamel with INDUSTRIAL NO. 6 NEUTRALIZER. Eliminates neutralizer salt deposits and streaks in vitreous-enamel ground coats. Minimizes rust after pickling. It lasts 2½ to 5 times longer than soda ash-borax or cyanide-type neutralizers.



In your painting department:

Simplify your processing with PRE-FOS®. Used on steel, zinc, or aluminum, PRE-FOS provides a superior base for paint, and greatly increases corrosion resistance. It simplifies your processing by cleaning and phosphating in a single operation. Its deposit of a fine grained, corrosion-resistant iron-phosphate coating saves paint and provides superior impact resistance. PRE-FOS may be adapted for spray or immersion use.

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***SERVICE MANAGEMENT SCHOOLS . . . . . ***
may be at least part of the answer to an improved customer service on appliances and radio-TV at the dealer-user level. At least that is the premise on which NARDA (National Appliance and Radio-TV Dealers Association) is conducting a second school this month in Chicago. It will be held March 24, 25 & 26 at Northwestern University Downtown Campus, 339-341 East Chicago Avenue.

NARDA sponsors an annual *Institute of Management* at The American University, Washington, D. C. in August. These meetings have been highly successful in the eyes of association officials. A full week of schooling is offered to NARDA members (including housing, tuition and study materials) for only $135.00 primary, $150.00 advanced. Prices are slightly higher for non-members.

At last year's management conference, consideration was given to establishing a school in Chicago for service management personnel. It was felt that there was "urgent need" for such a service, and NARDA officials decided to "take a gamble" and conduct a school in 1958.

The service school plan

The plan was designed to include any service manager in the "area" of the association's activity — Appliances and Radio-TV. Association membership was not a requirement. In many instances of small to medium-size dealers, the owner or manager came in person.

Plans were made at Wieboldt Hall for an estimated fifty "students." Eighty-eight registered from all parts of the country. Attendance included men from Michigan and Canada to Florida and Texas, and from Oregon and California to New Hampshire and Connecticut. Seventy-five per cent were service managers, while the remaining twenty-five per cent included store owners with service departments and miscellaneous (i.e., one public utility man did liaison work with dealers).

The course covered a three-day period, 8:30 A.M. to 10:00 P.M.," with the final period each day set aside for general discussions or "bull sessions." Even with time out for luncheon and dinner, that represented a long day on classroom seats. NARDA reported that "everyone stayed" for the late sessions.

Certificates of graduation were issued to all registrants upon completion of the course. A looseleaf book was furnished to each graduate, containing much of the "meat" from the school. This could readily form the basis for a local school for branch service managers, if the "graduate" desired to make this use of it.

What they want this year

A survey of 1958 graduates brought response from sixty of the eighty-eight. On a question concerning the value of the course, seventy-eight per cent responded "great value," twenty per cent said "considerable value," and 1.66 per cent said "moderate value."

Request for subject material for future school programs included: service shop layouts; more exact figures and shop operating procedures; incentive plans; routing procedures; comparison of quality and cost between factory and dealer service; more about gas appliances; cost accounting procedures; and methods for improving the stature of the service manager in the eyes of fellow executives. There was also demand for a psychologist speaker on the subject of "handling" women. (95 per cent of service calls involve contacts with women.)

There were also suggestions that the school concern itself less with "factory" or "ideal" service setups and more with actual dealer problems and case histories. Service managers want a better definition of the service manager function.

Keep in mind that the school had the multiple problem of serving the small dealer, large dealer (multiple stores), the manufacturers, and the service company (dealing in service only).

A case history

An example of specific results credited to last year's schools comes from William Galbreath, House of Television, Houston, Texas. Galbreath attended the NARDA Management School in Washington and his son attended the Service School in Chicago.

Practical results: this dealer almost doubled profit in 1958 over '57 on $31,000, *less* gross sales. He instituted sales budgeting and improved records.

House of Television service men now procure sales leads for commission. Stereo is installed when a set must be removed for service. One out of nine service calls now result in selling "something." This shows how both schools paid off.

Balanced program of speakers

The 1959 school has a group of top service executives as speakers, balanced between manufacturer and dealer. Keynote speaker is John S. McDermott, executive secretary, National Appliance Service Association.

The manufacturer lineup includes such well known names as Hotpoint's W. G. McNeal, Norge's E. G. Fenton, Frigidaire's Byron E. Hicks, Kelvinator's Robert S. Geran, Zenith's Ed Kob, GE's John H. Miller, and W. B. Creech of Westinghouse.

Dealer representation on the program includes key management and service executives from dealerships and service organizations in Detroit, Topeka, Paoli (Pa.), Kansas City, and other cities, large and small.

Advance registration points to increased attendance and a high percentage of repeat dealerships, with different men attending. Registration cost for the three day service school is only $75.00, including housing, meals, and study material.

The NARDA school would never be presented, we are sure, as *the* answer to the big appliance service problem, but it is certainly worthy of close scrutiny by the industry. If it continues to grow and show specific case history results in quantity, why not many schools in universities throughout the country, patterned after the NARDA plan?

Dana Chase

EDITOR AND PUBLISHER

Emerson 1958 Net Ten Times That of 1957 Figure

Emerson Radio & Phonograph Corp. has reported that its consolidated net income for the fiscal year ended Oct. 31, 1958 rose to $1,410,009, or 72 cents a share, more than ten times the preceding year's profit of $138,431, or seven cents a share.

Consolidated net sales increased to $58,401,170, from fiscal 1957's $54,803,069.

Stainless Steel Producers Predict Banner Year

The prediction that 1959 stainless steel output will substantially exceed 1958 tonnage has been made by the Committee of Stainless Steel Producers of the American Iron and Steel Institute.

The committee bases its outlook on 1958 fourth-quarter figures, which show stainless to be recovering more rapidly than total steel products from the '58 drop, and producer optimism of a steady expansion of recently-tapped markets. In view of this, industry estimates indicate shipments should closely approach 1957 figures.

Merger of Sylvania and General Telephone Approved

Share owners of Sylvania Electric Products, Inc., at a special meeting held recently, voted approval of the merger of Sylvania into General Telephone Corp. Concurrently in New York, share owners of General Telephone also approved the merger.

Share owners of General Telephone also voted a new corporate name, General Telephone & Electronics Corp. Donald C. Power, president of General Telephone, will become chairman of the board and chief executive officer of the combined corporation, while Don G. Mitchell will become president, also continuing as chairman of Sylvania. Sylvania will continue to operate as a separate company, wholly-owned by General Telephone & Electronics Corp.

Admiral Buys Pittsburgh Products Firm

Admiral Corp., Chicago, has purchased Pittsburgh Products Tri-State Co., a wholly-owned subsidiary of Joseph Horne Co., Pittsburgh, Pa., department store, according to an announcement by Carl E. Lantz, vice president for sales of Admiral. Pittsburgh Products has been distributor for Admiral in the trading areas of western Pennsylvania, specifically Pittsburgh and Altoona; Cumberland, Md.; and Wheeling, W. Va.

L. A. Anderson, who has been sales manager of Pittsburgh Products, becomes general manager of the Admiral subsidiary.

Waste King's Nine-Month Earnings Up

Waste King Corp., Los Angeles, achieved a 46.2-per cent increase in net earnings in the first nine months of its fiscal year on a sales increase of just over 7.4 per cent, Bertram F. Given, president, has announced.

Production Up on Studebaker

Production of 1959 model Studebaker Larks and Hawks has surpassed total 1958 model production of 52,416 cars, according to A. J. Porta, executive vice president. Production of 15,526 cars in January was the highest January since 1952. Production of the new Larks started the last week of September.

4th-Quarter Maytag Sales and Earnings Highest in History

With fourth-quarter sales and earnings the highest in its history, the Maytag Co. in 1958 showed healthy increases in both categories over the previous year, according to preliminary financial figures released recently by company officials.

Consolidated net sales in the record-breaking fourth quarter totaled $31,244,000, a 25-per cent increase over the $25,083,000 in the final three months of 1957. Earnings for the quarter were approximately doubled at $3,912,000, compared with $1,891,000 in the final quarter of 1957.

A. O. Smith Announces Ten-Year Permaglas Guarantee

A ten-year unconditional tank guarantee on top models of Permaglas domestic water heaters has been initiated by the A. O. Smith Corp., Kankakee, Ill. The policy will provide the homeowner with a new heater if tank failure occurs during the ten years following purchase.

The problem of strained customer relations caused by partial and pro-rated credit coverage is thus eliminated. In addition, lengthy and expensive explanations to the customer are done away with, the company states.

Milo Miller, general manager, consumer products, explains the guarantee's evolvement in this way: "The firm has developed new methods of fabricating longer-lasting and more-efficient glass-lined tanks. As this program develops better products, we want to pass them along — in this case, through improved protection — to our customers."

The guarantee is backed by a special corporate warranty fund set up solely for that purpose.

The first permaglas domestic water heater to carry the ten-year unconditional guarantee rolls off the production lines at the Permaglas Div. plant of the A. O. Smith Corp., Kankakee, Ill. On hand for the occasion are, left to right, J. W. Burleson, general sales manager; W. T. Halket, director of marketing; M. H. Miller, general manager, consumer products; and J. H. Brinker, vice president, all of the Permaglas division.

Waste King Acquires Control of Cribben and Sexton

Waste King Corp., Los Angeles, announced on Feb. 13 that it has acquired a controlling interest in Cribben and Sexton Co., Chicago. The West Coast appliance manufacturer has obtained 156,552-½ shares of Cribben and Sexton's common stock as a result of an offer to that company's shareholders, according to Bertram Given, Waste King's president. This gives Waste King 67 per cent of Cribben and Sexton's voting shares, he said.

Given stated that Waste King plans to operate Cribben and Sexton as an autonomous company, headed by Wendell C. Davis, its current president, who will retain that title, and with no changes in the Cribben and Sexton staff.

Pemco Corp. Gives Turk Merit Awards

James F. Devlin (right), service engineer of Pemco Corp., Baltimore, Md., receives a Heinrich and Karl Turk Merit Award at the firm's annual dinner. James Willis, service manager, and Richard Turk, chairman, congratulate Devlin. Similar awards were presented to James F. Feeney, control; Vernon C. Jett, research and development; and Charles Simonsen, production.

Flood Restoration Plan Put Into Effect by Maytag

The Maytag Co., Newton, Iowa, has placed its unique flood restoration program into effect in Columbus, Ohio to aid the hundreds of Maytag washer owners whose homes were damaged by the recent floods. Service personnel from the company's Minneapolis, Kansas City, and Indianapolis branch offices have been rushed to Columbus to assist area service personnel with the project.

One of the features of the project is the warning of residents, through the medium of newspaper ads, against plugging in any electrical appliances that have been under water. The ads also offered to repair any flood-damaged Maytag appliances at half the normal cost, with Maytag supplying any needed parts at half price.

Gaffers and Sattler to Begin Construction on Headquarters

Gaffers and Sattler has begun construction on their new world headquarters in Los Angeles. There will be a total of 21,200 square feet of floor space, including 4,000 square feet on the first floor for a permanent display room of the various appliances they manufacture. The building is scheduled for completion in June, 1959.

Rheem Forms Department for Growth and Acquisition

Appointment of Robert T. Stroup as manager of a newly-formed growth and acquisition department of Rheem Mfg. Co. was announced recently by A. Lightfoot Walker, president. The department will "formalize and intensify programs for company growth through acquisition or development of new product lines," Walker said.

He added that the department would "actively seek opportunities for acquisition or development, investigate them, and conduct negotiations for properties promising profitable compatibility with Rheem engineering, production, and marketing skills."

AHLMA Reelects Officers for 1959 Term

Homer L. Travis, chairman of the board; Jack D. Lee, vice chairman; and Greg M. Sheehan, treasurer, were reelected for one-year terms by the board of directors of the American Home Laundry Manufacturers Association, meeting in Chicago recently. Guenther Baumgart continues as president of the association, which represents practically 100 per cent of all United States manufacturers of home washers, (automatic and wringer), gas and electric clothes dryers, combination washers-dryers, and automatic ironers. All reelected officers are serving their second consecutive terms.

BRI Meeting to Feature Wide Variety of Subjects

Half-day and full-day technical workshops on a wide variety of subjects will make up the program for the Building Research Institute's 8th Annual Meeting, scheduled to be held this year at the Penn-Sheraton Hotel, Pittsburgh, Pa., April 7-8.

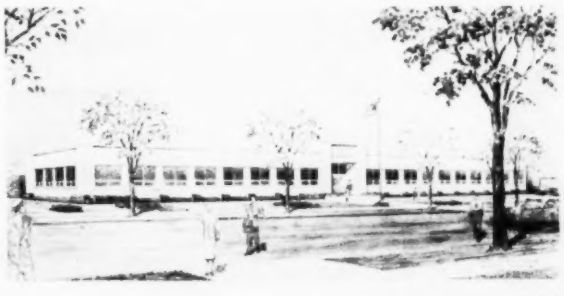
Kelvinator Launches Contest for Dealers

Ten Kelvinator dealers will attend the 1959 NARDA Institute of Management under the annual "George Rom-

Ross Engineering Occupies New Suburban Building

The Chicago offices of the J. O. Ross Engineering Div., Midland-Ross Corp., have moved into the company's new building at 370 S. School St., Mt. Prospect, Ill., (Chicago suburb). The Hartig Extruder Div., Midland-Ross Corp., and the John Waldron Corp., a subsidiary of Midland-Ross, have also moved their Chicago offices into the new building.

The building has approximately 12,500 square feet of floor space, and the site provides for future building additions.



New office building at Mt. Prospect, Ill., which houses offices of the J. O. Ross Engineering Div., Midland-Ross Corp.; Hartig Extruder Div., Midland-Ross; and John Waldron Corp., Midland-Ross subsidiary. Site provides for future building additions.

ney Scholarships," announced recently by Walter Jeffrey, vice president and general manager of Kelvinator.

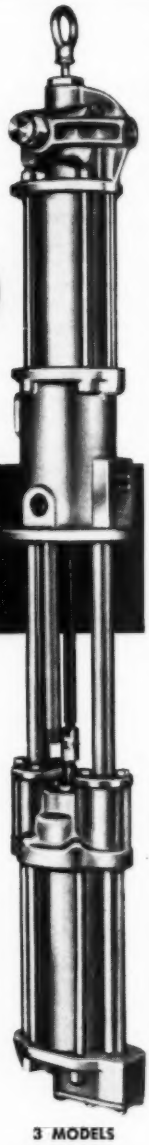
The scholarships, which include all expenses for the week-long management program in Washington, D. C., will be awarded annually to the ten Kelvinator dealers who "contribute most to raising the stature of appliance selling in their communities during the January-July period of this year." Jeffrey said.

New Developments in Spraying at Binks Spring School

According to Burke B. Roche, president, Binks Mfg. Co., Chicago, the spring sessions of the firm's spray painting school will provide detailed instruction on electrostatic spray systems, automatic finishing techniques, and several new equipment developments in the spray painting field. Equipment includes an electro-mechanical memory timer, an eight-arm rotary sprayer, and new developments in vertical and horizontal reciprocating spray machines and spindle machines.

The Binks tuition-free school has scheduled spring sessions on the following dates: March 2-6, April 6-10, May 4-8, and June 1-5.

NOW!
FASTER
SUPER-POWERED
PAINTING
WITH NEW "P-78" ALEMITE PUMP!



Full 5.4 horsepower! More powerful than any other paint pump on the market, more efficiently designed... more sturdily constructed . . . the new Alemite "P-78" assures faster, more efficient delivery through long lines and numerous outlets! Pumps paint up to high floor levels . . . eliminates movement of equipment and hand transferring . . . speeds production! Check these "P-78" Pump advantages:

High Volume—models deliver from .4 to .65 gallons per cycle. **Maximum System Capacity**—serves 2 miles of pipeline. **Smooth Pumping Action**—handles all finishing materials, including fast settling acrylic lacquers. **Lightweight**—all aluminum body weighs only 76 lbs.

Write for New Alemite "P-78" Pump Catalog!

Symbol of SW Excellence
ALEMITE DIVISION
STEWART-WARNER CORPORATION
1826 Diversey Parkway, Chicago 14, Illinois

3 MODELS
Low-Pressure (1.4 to 1 ratio)
Medium-Pressure (1.7 to 1 ratio)
High-Pressure (2.2 to 1 ratio)

De-enameling Process

Porcelain enameled production rejects are said to be reclaimed quickly and economically through a chemical process known as deNAMEL. Multiple coats of porcelain are said to be completely removed in five to 15 minutes immersion. The manufacturer, Kolene Corp., Detroit, Mich., states that no trace remains on the ware, including corners, crevices, or points of heavy build-up.

Sharon and Pittsburgh Steel Merger Discussions Terminated

Management of Sharon Steel Corp. and Pittsburgh Steel Co. have announced that it did not appear probable that a satisfactory basis for a merger could be reached; therefore, merger discussions were being terminated.

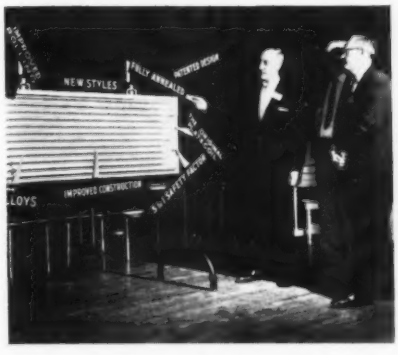
Whirlpool in Brazil

Whirlpool Corp., St. Joseph, Mich., recently announced its participation in the formation of Multibras-Industria de Aparelhos Domesticos Ltda., a Brazilian appliance manufacturer. In this new concern, Whirlpool will be associated with Companhia Industrial E. Commercial Brasmotor, a Brazilian manufacturing and distributing company. Brasmotor will operate the new company, and Whirlpool will provide technical assistance.

The new company will manufacture a line of appliances designed by Whirlpool for sale in Brazil through Sears, Roebuck & Co. and Brasmotor. Initially, Coldspot refrigerators for sale through Sears stores in Brazil, and Brastemp refrigerators for sale through independent outlets, will be manufactured. A full line of washers and air conditioners will follow.

Introduces New Product

Introduction of a new product, Multizone "Platecoil," highlighted a sales meeting of Tranter Mfg., Inc., held recently in Lansing, Mich. "Platecoil" is a



heat transfer unit made of two sheets of embossed metal welded together to form passages for heating and cooling media. It replaces pipe coil in industrial heating and cooling applications. Company executives are shown here with S. J. Stowell, sales manager, pointing out the product's features.

Koehring Co. Purchases Cast-Master, Inc.

The acquisition of the complete business of Cast-Master, Inc., Bedford, Ohio, has been announced by Julien E. Steelman, president, Koehring Co., Milwaukee, Wis. Cast-Master is a manufacturer of die casting machines, and the purchase of the Ohio firm, involving an exchange of stock, was stated to be in excess of $1½ million.

Current plans call for the continued operation of Cast-Master in its leased plant at Bedford, but as a division of Koehring's Hydraulic Press Mfg. Div., Mount Gilead, Ohio. Clarence E. Taylor, president of Cast-Master, and Howard P. Miller, secretary-treasurer, will join the Koehring firm.

Electronics Division Formed by USCMC

United States Chemical Milling Corp., a large producer of chemically-milled products for the aircraft and missile industries, recently announced the formation of an electronics division.

Charles H. Lundquist, president of USCMC, stated that the new division has complete manufacturing facilities for the design and production of all types of printed circuit boards and chemically-blanked parts. These facilities include an analytical and control laboratory, photography, plating, etching, machining, and assembly operations.

All Major Appliances Up in December — Some Ahead for Year

According to statistical information received from the associations listed on page 68 in Metal Products Statistics, all major appliances were up in factory sales or production for December, 1958 over 1957. Percentages were up as much as 86 per cent for dishwashers. Other highs were: built-in electric ranges, 62 per cent; combination washer-dryers, 80 per cent; built-in gas ranges, 49 per cent; gas clothes dryers, 41 per cent; and electric refrigerators, 34 per cent.

It is also interesting to note that the recovery during the last six months of the year was good enough to send the totals for 1958 ahead of 1957 in some categories. Some of the appliances that went ahead were gas water heaters, six per cent; built-in gas ranges, 17.5 per cent; electric freezers, 19 per cent; built-in electric ranges, 28 per cent; dishwashers, 9 per cent; and vacuum cleaners, 3 per cent. See MPM Statistics on page 68.

More News on Page 79 →

The best place to get the steel you want when you want it— is your LOCAL STEEL SERVICE CENTER

525 independent steel warehouse companies, which operate 900 separate steel service centers throughout the United States, maintain an $800 million inventory of more than 3,000,000 tons of steel in all forms, sizes, types, finishes and analyses. No matter where you are located, your local steel service center is best equipped to supply all your metalworking needs, both from the standpoint of economy and quick delivery. Some 15,000 metal specialists selling for these distributors are fully qualified to help you with your problems of selection and fabrication.

AMERICAN STEEL WAREHOUSE ASS'N.

STAINLESS STEEL is stocked in 252 of these Steel Service Centers, many of which carry MICROROLD Stainless sheet and strip made by the Washington Steel Corporation.

WASHINGTON STEEL CORPORATION · STAINLESS · SHEET & STRIP

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Castings by ACME ALUMINUM FOUNDRY CO., Chicago

. . . here's your ANSWER!

MACCO
ALUMINUM CLEANER NO. 19

Even the finest organic or ceramic coatings are not satisfactory unless the base metal is CHEMICALLY CLEAN. MACCO No. 19 is a brilliant, new, streamlined 1957 chemical development, *ideal for use in either spray type washer or tank.* This highly efficient cleaner will thoroughly CLEAN and BRIGHTEN aluminum and die cast metal WITHOUT ATTACK. *Just One Operation—No Smut—No Acid Dip.*

simple . . . economical . . . sure

Manufacturers of Better Metal-Working Compounds since 1931

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MACCO PRODUCTS COMPANY

Presstime News

Republic Leases Space

Republic Aviation Corp. recently announced it has leased 30,000 square feet of floor space from the Fairchild Engine Div. in Deer Park, Long Island, N. Y. The space, located in the engine division's main plant, will house Republic's research and development engineering department until next January, when the firm's new $14,000,000 research and development center will be completed.

New Crosley Division Contract

Contracts totaling $2,100,000 for important components of the Falcon missile have been received by the Crosley Div., Avco Mfg. Corp. The work will be done at the Crosley Div.'s plant in Richmond, Ind.

New Sales, Shipment Records Set at Permaglas

New monthly records for orders and shipments were compiled on domestic and commercial water heaters during January by the Permaglas Div., A. O. Smith Corp., Kankakee, Ill., M. H. Miller, general manager, Consumer Products, disclosed. Shipments of $3,200,000 exceeded by 13 per cent the previous January high established in 1957, and by 16 per cent January, 1958 totals.

At the same time, the sale of commercial water heaters and storage tanks reached a record high both in dollar volume and new orders. Orders were up 21 per cent over January, 1958, while dollar volume showed a 22-per cent gain.

New Division for NAAMM

The Store Front and Entrance Div. of the National Association of Architectural Metal Manufacturers will be formally organized at the association's annual convention, April 12-17, 1959 at the Monteleone Hotel, New Orleans, La., it was announced by Paul C. Crawford, president of the association.

Members of the Organizing committee are: Norman Bienenfeld, The Alumiline Corp., Pawtucket, R. I., chairman; Thomas A. Beyrle, Acme Metal Molding Co., Los Angeles, Calif.; T. Hallett Rebele, Rebco, Inc., Los Angeles; David S. Miller, Kawneer Co., Niles, Mich.; D. D. Williams, Brasco Mfg. Co., Harvey, Ill.; and F. J. Cosmann, Miller Industries, Inc., Reed City, Mich.

Information regarding membership in the Store Front and Entrance Div. may be obtained by writing to the National Association of Architectural Metal Manufacturers, 228 N. LaSalle St., Chicago 1, Ill.

Interchemical Earnings Up Three Per Cent over 1957

Net earnings of Interchemical Corp., a leading manufacturer of printing inks and chemical coatings, for the year 1958 were up 19.3 per cent from the figure for the previous year, although sales were about equal to those for 1957, according to preliminary figures released recently by H. B. Woodman, president.

Kelvinator January Up 25 Per Cent

Kelvinator dealer billings in January increased by 25 per cent over January of last year, and were also up by 26.3 per cent over December, according to Homer L. Travis, vice president in charge of sales.

Home laundry equipment led the January factory sales increase with a jump of 36.6 per cent over January, 1958. Refrigerators followed closely with an increase of more than 30 per cent, and freezers showed a 19-per cent gain.

PMI Spring Technical Sessions in Chicago, March 11-13

The 1959 Spring Technical Meeting of the Pressed Metal Institute is scheduled to be held at the Pick-Congress Hotel, Chicago, March 11-13. The meeting, PMI's tenth anniversary, will feature such well-known speakers as Allan H. Mogenson, Stanley R. Cope, Sanford J. Douglas, Harry A. Stuhldreher, and others.

Featured among the sessions will be one on "Explosive Forming," and a discussion on "Stampings made by Dynamite." A special-request highlight will be a problem-solving clinic under the direction of Stanley Cope.

Conference on Quality Control

The 7th Northwest Conference on Quality Control, sponsored by the Portland Chapter of The American Society for Quality Control, is scheduled to be held in Portland, Oregon, April 3-4, 1959, at the Oregon Museum of Science and Industry.

NAMA Executive Director Change Due in 1959-1960

The forthcoming retirement of Clinton S. Darling as executive director of the National Automatic Merchandising Association when he reaches the mandatory retirement age in 1960, and the appointment of Thomas B. Hungerford, St. Louis, as his successor, were announced recently by William S. Fishman, association president.

"To achieve an orderly transition of management, Mr. Hungerford will assume his new duties with NAMA on August 1, 1959, and until August 1, 1960, he and Mr. Darling will jointly direct the staff and affairs of the association," Mr. Fishman added.

Acme Industries, Inc., Jackson, Mich., has announced appointment of **Ralph A. Wilkins** as National service manager. He was formerly service manager of the Detroit branch of Frigidaire Sales Corp.

International Resistance Co. announces the appointment of **A. H. Hardwick** as special assistant to the president. He will assume responsibilities for trade and industry relations. A vice president of IRC, he joined the company in 1944.

William Dean Nicol, former sales and service engineer with Chicago Vitreous Corp., and enamel superintendent at Crown Stove Co., Cicero, Ill., and Altorfer Bros. Co., Peoria, Ill., has been transferred to the Grand Rapids, Mich. plant of **Kelvinator Div., American Motors Corp.,** as process engineer.

Rolled Formed Products Co., Youngstown, Ohio, has announced that **Louis C. Colleran** has been named vice president in charge of sales. He was formerly sales manager, and joined the firm in 1947 as a sales representative.

☆☆☆☆☆☆

COMING FEATURES

DESIGN

ALL-ELECTRIC HEATING AND COOLING WITH THE LENNOX LANDMARK

THERMOSTATS — THEIR OPERATION AND USE

FABRICATION

FABRICATION OF STAINLESS STEEL, PART TWO

WATER HEATER TANK LINE FEATURES AUTOMATIC WELDING

FINISHING

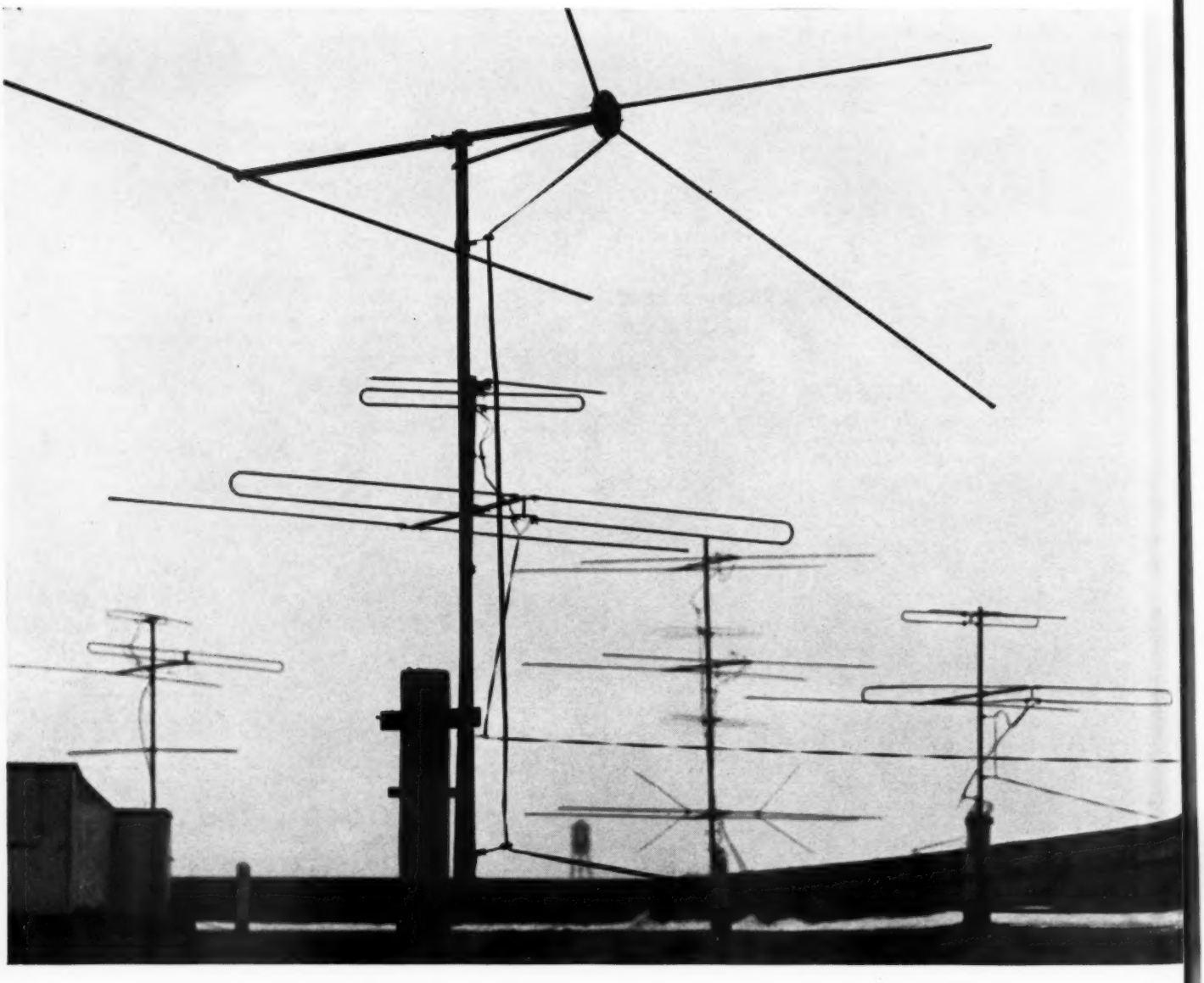
NEW ROLL COATER LINE FOR FINISHING METAL STRIP

GLASS LINING WATER HEATER TANKS AT REPUBLIC-ODIN

GENERAL

ANNUAL STATISTICAL REVIEW

VINYL-ON-STEEL PRODUCED AT THE MILL



WHICH ONES WILL LAST (and last, and last!)?
THOSE MADE OF WEIRKOTE® ZINC-COATED STEEL!

Steel tubing that's protected against corrosion even under the most trying circumstances. Steel tubing that's easily fabricated to meet the most exacting specifications.

That's what you get in tubing made of Weirkote zinc-coated steel!

Weirkote's zinc coating—applied by the continuous process throughout, and so uniformly that every square inch is protected—is skin-tight. There's absolutely no flaking or peeling no matter how tortuous the crimping, twisting or other stresses of fabrication. In fact, Weirkote can be worked to the very limits of the steel itself.

The use of Weirkote can eliminate the need for any further coating process after fabrication. Its tight zinc coating is completely intact and remains so during fabrication and on the job. Weirkote zinc-coated steel tubing is particularly suited for jobs where weather is a factor to be taken into consideration.

Take a good long look at the possibilities and advantages of using Weirkote zinc-coated steel to meet your tubing requirements. For the complete story on Weirkote and how it can help you, write Weirton Steel Company, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

News of the industry

→ *from Page 75*

Crane Co. to Enlarge Board of Directors

Management will submit the names of eleven nominees for the board of directors to Crane Co. shareholders on March 26, the company announced. The annual Crane shareholders meeting will be held in Chicago on April 28.

Standing for reelection to the board are: Neele E. Stearns, Crane president; William L. McKnight, chairman, Minnesota Mining & Mfg. Co.; S. M. Roberts, president, C. A. Roberts Co.; Anthony von Wening, president, Basic Products Corp.; Gurdon W. Wattles, chairman, Electric Auto-Lite Co.; R. Arthur Williams, president, Standard Railway Equipment Mfg. Co.; and Mark W. Lowell, vice president, Continental Illinois National Bank and Trust Co., Chicago.

Nominated for places on the board, in addition to the seven incumbent directors, are: T. M. Evans, chairman of H. K. Porter and Co.; Alfons Landa, president of Penn-Texas Corp.; E. A. Locke, Jr., president, Union Tank Car Co.; and R. B. Crane, representing the Crane family.

General Electric Moves Against Unsound Pricing

The housewares and receiver division, General Electric Co., makers of toasters, vacuum cleaners, mixers, etc., has taken steps to eliminate what the firm calls "unsound and uneconomic advertising practices" in the cooperative merchandising of products, it has been reported.

Company officials said, in a letter to distributors, that the company will no longer share the costs of cooperative advertising with dealers selling GE products below a level of 10 to 15 per cent under suggested retail prices.

Exhibits, Papers Highlight Western Metal Exposition

Thirty-six industrial exhibits and more than 100 scientific technical papers will highlight the forthcoming Western Metal Exposition and Congress scheduled for Los Angeles' Pan-Pacific Auditorium March 16-20.

Technical sessions will be held concurrently at the Ambassador Hotel, Los Angeles.

IHEA Announces New Industrial Oven Division

The formation of an Industrial Oven Division, composed of 12 manufacturing firms producing 60 per cent of the nation's industrial ovens, has been announced by the Industrial Heating Equipment Association.

Robert Baker, R. C. Mahon Co., and Chester J. Schmidt, J. O. Ross Engineering, were elected chairman and secretary, respectively, of the division by its nine new and three established IHEA members.

Present member companies of the Industrial Oven Division are:

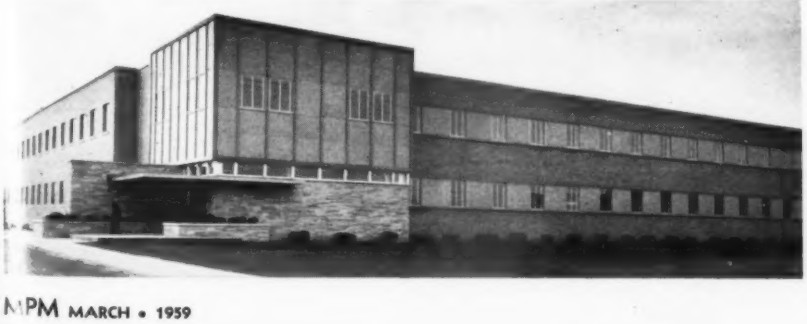
Cincinnati Cleaning & Finishing Co., Cincinnati, Ohio.
The Electric Hotpack Co., Philadelphia, Pa.
Foundry Equipment Co., Cleveland, Ohio.
Geo. Koch & Sons, Inc., Evansville, Ind.
Lindberg Engineering Co., Chicago, Ill.
The Lanly Co., Cleveland, Ohio.
The R. C. Mahon Co., Detroit, Mich.
The Michigan Oven Co., Detroit, Mich.
W. S. Rockwell Co., Pittsburgh, Pa.
J. O. Ross Engineering Co., New York, N. Y.
The Spra-Con Co., Chicago, Ill.
Trent, Inc.

Du Pont Opens New Research Center for Electrochemicals

A new, modern research center for Du Pont's Electrochemical department has been formally opened at Niagara Falls, N. Y. Dr. Campbell Robertson, laboratory manager, said the new building will be the focal point for research and development work on products and processes vital to the department's established business in sodium, vinyl products, peroxygen compounds, nylon intermediates, and related fields.

The building has a floor area of 44,000 square feet, and contains 15 laboratories. Construction is of brick and steel frame, with light green trim of vitreous enameled aluminum.

New Du Pont research center at Niagara Falls, N. Y., features trim of vitreous enamel on aluminum. Color of trim is light green, and can be seen over stone work at corner of building, and between windows on second floor.



Editor's mail

→ *from Page 5*

editions of MPM. I have really missed the last few editions of MPM which was due to the transfer. Having been on your mailing list since you first went to press as "Finish" and later as MPM, you can appreciate how I feel when I miss one single copy.

William Dean Nicol, Process Engineer
Kelvinator Div., American Motors Corp.
Grand Rapids, Mich.

Of importance in sales training

Gentlemen: I have been reading your interesting publication for a number of years. (I remember when it was called "Finish.") The articles are very interesting and informative, and I have used several of them in training and working with our sales engineers.

Charles N. Chalfant
Products Manager, Metal Finishing
Kelite Corp., Berkeley Heights, N. J.

A Seaporcel installation

The article "Producing and marketing architectural porcelain," which ran in the January, 1959 issue of METAL PRODUCTS MANUFACTURING, featured the Caloric Appliance Corp. However, the Page Elementary School, shown on page 42 to illustrate the general use of architectural porcelain, was built with panels supplied by Seaporcel Metals, Inc., Long Island City, N. Y. The photograph was inadvertently supplied to us with other illustrations for the Caloric feature. In fairness to Seaporcel, we felt that this should be pointed out to our readers.

Eds.

Interesting and informative

Gentlemen: We find your publication most interesting and informative. Please continue to forward it to me as well as to the other members of our staff already receiving it.

R. A. Woolsley, President and General Mgr.
Porcelain and Metal Products, Ltd.
Orillia, Ontario, Canada

Airless spray article

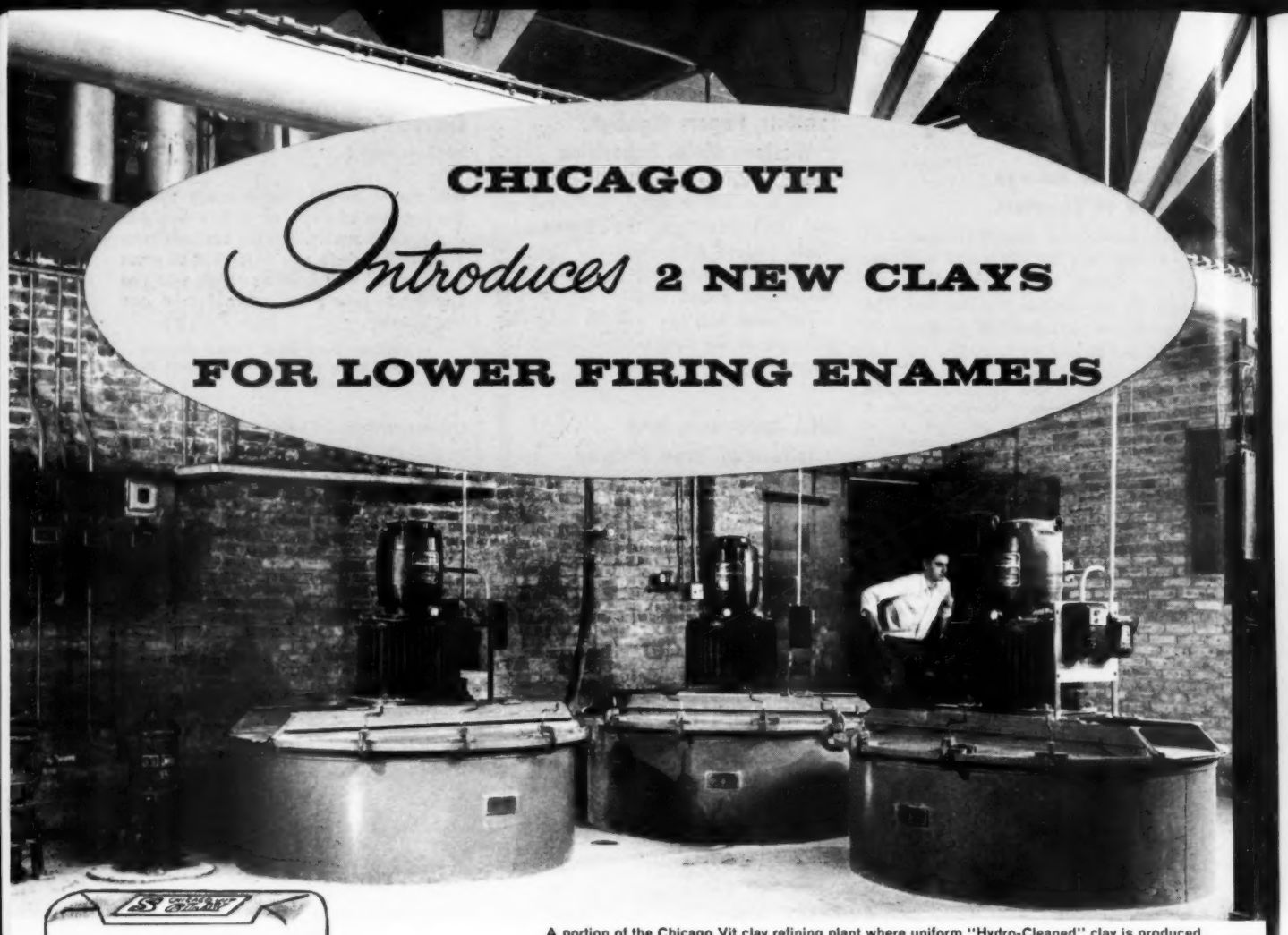
Gentlemen: Thank you very much for your fine article in the January issue of MPM magazine, concerning "Airless spray painting of fluorescent lighting fixtures," as utilized by our company.

Because of your article, we have received inquiries from other manufacturers interested in airless spray painting, and they have been promptly answered.

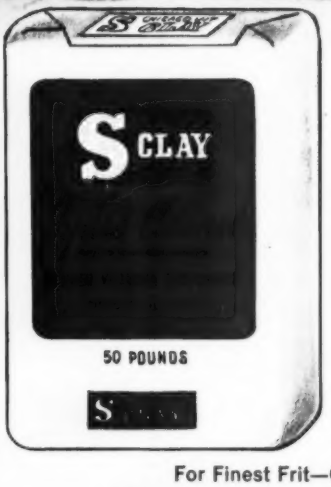
This attests to the popularity, interest, and value of your METAL PRODUCTS MANUFACTURING magazine among the trade . . .

Ernest F. Karbe, Vice President
R. & W. Wiley, Inc.
Buffalo, N. Y.

CHICAGO VIT *Introduces* 2 NEW CLAYS FOR LOWER FIRING ENAMELS



A portion of the Chicago Vit clay refining plant where uniform "Hydro-Cleaned" clay is produced.

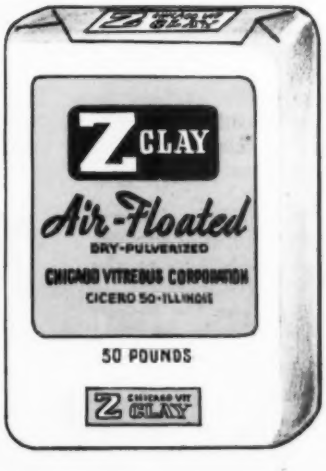


S CLAY,

Hydro-Cleaned

S clay is a hydro-cleaned clay with high set characteristics and good set stability. It is recommended for use in cover coats where its set properties will allow a reduction in clay content to effect improved acid resistance.

For Finest Frit—Chicago Vit



Z CLAY,

Air-Floated

Z clay is an air-floated clay with medium high characteristics and good suspending properties. It was selected for use in low temperature ground coat enamels because it provides good workability and early maturity. It is generally used in combination with X clay to develop optimum bubble structure. It has good set stability.

Here, now, are 2 new clays especially developed by Chicago Vit for use in today's lower firing enamels. The study and development of clay blending and clay performance, carried on over the years, is one more unheralded service of the Chicago Vit research and development laboratories. The over-all result is simply this: You can demand and get from Chicago Vit a clay that has been blended to impart particular characteristics that assure you of better enameling results and higher quality in your finished products.

You will find it advisable to discuss clays with your Chicago Vit representative. He will be pleased to recommend those most suited to your needs.

Chicago Vitreous CORPORATION

1425 South 55th Court, Cicero 50, Illinois

A Division of the Eagle-Picher Company

INDUSTRY PERSONALS

BECKMAN

CARLSON

RITTER

YOUNG

Westinghouse Electric Corp. has named **J. G. Ritter** as manager of facilities planning at the Columbus, Ohio plant, it has been announced by E. L. Smith, manager of operations there.

He replaces T. P. Dunkin, who is leaving the company to assume the position of executive officer for Megal Corp., Milwaukee, Wis.

In his new position, Ritter will be responsible for industrial engineering, tool division, works engineering, and other allied functions.

Morrison Products, Inc., manufacturer of blower wheels and assemblies, has promoted **Peter Kardos** from project engineer to chief engineer, according to Thompson Morrison, president. Kardos succeeds **Alexander Galaba,** who will devote his full time to the activities of vice president for sales.

Wall Tube & Metal Products Co., manufacturers of welded and seamless stainless steel tubing, announces the appointment of **John F. Ault** as executive vice president, and **P. Frederick Lesley** as factory manager.

Ault was formerly vice president, manufacturing and engineering, of the O. Ames Co., Parkersburg, W. Va. Earlier, he was with Olin Mathieson Chemical Corp. Lesley was formerly chief engineer at Wall Tube.

Inland Steel Co. announced recently that **Derrick L. Brewster** has been named general manager of sales to succeed Robert M. Buddington, who was recently elected sales vice president of the company. **James C. Fausch,** who has been manager of the New York district sales office, succeeds Brewster as assistant general sales manager, and **John B. Judkins** has been transferred from the tin plate sales department of the home office to succeed Fausch in New York.

Signode Steel Strapping Co.'s board of directors has elected to the office of assistant vice president the following: **Joseph F. Beckman, M. C. Carlson,** and **Hobart P. Young.** Beckman has been with the firm for 33 years, and will function as manager of the steel industry sales division. Carlson will function as manager of the general sales division, and Young will assume the duties of manager of the Glenview tools and seals division. This unit is undergoing a major expansion program, the report states.

Vance Industries, Chicago, manufacturers of stainless steel sink frames and sink bowls, has elected **Roy L. Colt,** executive vice president since February, 1955, to the position of president of the firm. Colt succeeds **Harold V. Snyder,** who was elected to the office of chairman of the board of directors.

Chainveyor Corp., manufacturer of overhead conveyor systems, announces the advancement of **J. T. Holley** to factory manager of the Los Angeles plant. Holley started his career with Chainveyor in 1950 in inspection. For the last two years, he has operated as West Coast installation supervisor.

United Wallpaper, Inc. has announced the promotion of **Leroy A. Chloupek** to director of industrial research, and the promotion of **Robert W. Mountsier** to technical director of Illinois Paint Works, the position formerly held by Chloupek.

According to G. A. Nichols, vice president, research, United Wallpaper, Chloupek will direct the industrial coatings research and development in the central research laboratories in Chicago, and will be responsible for co-ordinating this activity with the industrial coatings research and development work done throughout the company.

The Maytag Co., Newton, Iowa, has named **Dan Macdonald** as product service instructor at the company's service department at Newton, it has been announced by S. R. Payne, general service manager for the appliance firm.

In his new position, Macdonald will be responsible for instructing service schools at Newton, introducing new products from a service standpoint, and the systematic development of training aids. He succeeds George Sundberg, who has been selected as a staff marketing assistant in the marketing division's development program.

American Standard has announced the promotion of **F. G. Coggin** to vice president of the Detroit Controls Div. The announcement was made by F. J. Kreissl, division president.

Whirlpool Corp. has reported that **Hal Sadwick,** formerly at porcelain enamel control, home laundry department, Hotpoint, has joined Whirlpool's St. Paul division in the porcelain enameling department. He was with Cribben & Sexton before joining Hotpoint.

A. O. Smith Corp. has named **Archie C. Anderson** technical director of the firm's new reinforced plastics division, it has been announced by James F. Donnelly, Sr., general manager of the division. Donnelly also announced the appointment of **Dwight H. Davis** as controller and administrative assistant of

AULT

LESLEY

CHLOUPEK

MOUNTSIER

HOLLEY

COLT

the division, which was set up last month with headquarters in Milwaukee, Wis.

Reynolds Metals Co. has announced the election of **Albert M. Cole** as executive vice president of Reynolds Aluminum Service Corp., a Reynolds Metals subsidiary. Cole recently resigned as federal housing administrator.

Phillips & Buttorff, Nashville, Tenn., at the recent annual meeting of stockholders and board of directors, announced that **G. Paul Clements** has been named to the board of directors and elected vice president of the corporation. He has been with the firm since 1955, and has served in various management capacities. Presently, he is general sales manager in charge of all sales efforts, including gas and electric ranges, foundry products, and contract sales in foundry and metal fabrication.

COLE

CLEMENTS

The Grigoleit Co., manufacturers of molded plastic and metal products, has announced that **Charles M. Pieper** will represent the company in the Ohio and Indiana area. Pieper has been associated with the Frigidaire Div., GMC, in various departments for a number of years.

Robertshaw-Fulton Controls Co. has named **D. Rex Scott** assistant general manager of the firm's Western Research Center, Anaheim, Calif., according to an announcement by Thomas H. Jeffers, general manager of the research facility. At the same time, **John E. Daugherty** has been named sales manager, International department, according to A. W. Beck, vice president, marketing.

Inland Steel Co. has announced that **J. P. Novak** has joined the firm as technical representative, quality control. He succeeds **Niel Gibbs,** who was promoted to supervisor of technical representatives, quality control. Novak was formerly associated with Chicago Vitreous Corp.

Detrex Chemical Industries, Inc., announces the promotion of **R. B. Preston** to manager of national accounts. He has had fifteen years' experience with the firm, all of which has been spent in sales and chemical service in the pre-treatment of metals prior to finishing.

Midland-Ross Corp., has announced the election of **Charles B. Harding,** senior partner of the investment banking firm of Smith, Barney & Co., and **Kent H. Smith,** acting president of Case Institute of Technology, to the board of directors of Midland-Ross.

Northwest Chemical Co. has announced the appointment of **R. O. Watson** as sales and service engineer for the South Indiana area. The announcement was made by H. J. McCracken, president.

Chicago Steel Service Co. announces the following appointments: **Jay W. Stranahan** to the post of manager of sales; and **Fred C. Kemmerling** to manager of operations.

Kelvinator Div., American Motors Corp., has announced that **Carl F. Zeman,** former traffic manager at Altorfer Bros. Co., Peoria, Ill., has transferred to Kelvinator at Grand Rapids, Mich., and will hold a similar post.

HEATH

NORRIS

Hancock Industries, Jackson, Mich., has announced the election of **W. C. Heath** to the board of directors. He was former president and chairman of the executive committee of A. O. Smith Corp.

Hancock Industries now has two divisions and two subsidiaries: Hancock Mfg. Div., (fabricated metal products); Telecontrol Div., (production control and in-plant communications equipment); General Sound Control Co., Los Angeles, (silencing equipment for jet engines); and Computer Measurements Corp., also of Los Angeles, (electronic computers and allied equipment.)

American Brake Shoe Co., Columbus, Ohio, has named **Paul W. Norris** president of Denison Engineering Div. Announcement of Norris' appointment was made recently by W. C. Denison, founder of Denison Engineering, designer and manufacturer of hydraulic presses, pumps, controls, and systems. Norris has been with Denison 25 years.

Adelphi Paint & Color Works has announced that **Joseph Tarantola** has been appointed technical director of the firm's industrial division.

Detroit Controls Div., American Standard, has, according to F. J. Kreissl, division president, promoted **John S. Amneus** to manager of research and advanced development; **Richard L. Campbell** to divisional director of engineering; and **Thomas E. Noakes** to chief engineer, Detroit products.

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editorial voice of the national safe transit program

devoted to improving packaging methods and shipping and materials handling methods for the appliance and metal products manufacturing industries. This section contains plant experience information and industry advances for the use of all executives and plant men interested in improving packaging and shipping methods and in loss prevention. The section contains complete information on the national safe transit pre-shipment testing program for packaged finished products and detailed reports of divisions and sub-committees of the National Safe Transit Committee.

NST to Publish Certified Products List

With many forecasts indicating that consumer preference in 1959 will be for improved quality, performance, and service, NSTC, Inc. assumes new significance as an aid to the manufacturing and shipping industry with its projected publication of an NSTC Certified Products List. The list will be published on a quarterly basis beginning April 1, 1959.

The list will emphasize the fact that manufacturers whose products meet the requirements of the NSTC pre-shipment tests are maintaining high standards of quality, both in design and production. In order to take advantage of this important new service, a manufacturer must be a certified participant in the NSTC program. Each product to be listed must meet NSTC test requirements on a regular basis, and be identified by a Safe Transit label.

Is Your Company Certified for 1959?

New 1959 NSTC certified manufacturer and laboratory lists will be published on a quarterly basis, the first list having been printed January 30. In order for a company's name to appear on the manufacturer's list, evidence must be furnished to NSTC, Inc. of its intent to participate in the recently-revised NSTC program which established new requirements for certification. These requirements are: (1) use of the Safe Transit labels on packaged products, and (2) a minimum frequency of testing.

A new laboratory requirement is the addition of an annual certification fee of $100.

New Laboratory to Serve Rochester Area

Mohawk Containers, Inc. opened its newest laboratory at Rochester, N. Y. early in February, according to M. C. Morgan, director of research. An open house was held.

Edg-Pak Sample Card Shows 8-Way Edge Protection

A new Edg-Pak sample card, showing eight ways in which the spring-grip cushioning material is available for reportedly improved, low-cost protection of critical edges, surfaces of nested pieces, and steel strapping in materials handling and packaging, may be had from Flex-O-Lators, Inc., Carthage, Mo.

Complete with actual new 2" and 1¼"-width strips in several of the new inner liners and outer covers, the sample card gives complete specifications of eight combinations now offered, and describes the advantages of the "Strength of Steel" spring grip. Also listed are U. S. Air Force Catalog Stock Numbers, and sizes of pre-cut lengths and quick-feeding rolls now available.

Packaging Exposition set for Chicago, April 13-17

The American Management Association's 28th National Packaging Exposition and Conference is scheduled to be held at the International Amphitheatre, Chicago, April 13-17. The show will be accompanied by the association's National Packaging Conference at the Palmer House, April 13-15.

Packaging trends that will be in evidence at the show, according to C. L. Rumberger, vice president, research and quality control, H. J. Heinz Co., Pittsburgh, Pa., and vice president in charge of the American Management Association's packaging division, include more emphasis on plastics and aluminum foil, lighter but stronger fiber and corrugated boxes, more use of combinations of materials, and increased stress on packaging materials that will both improve product protection and enhance salability.

All manufacturing, engineering, and quality efforts are in vain if the product reaches its destination in a damaged condition.

52-Page Handbook on Roller Gravity Conveyors

This new roller gravity handbook is a reference book for the engineer who uses conveyors to solve unit load handling problems.

There are many descriptive illustrations and photos explaining the application of gravity conveyors and more common accessories. Easy-to-read charts and graphs are included to assist the engineer in matching a conveyor to the loads. The book has a new flavor in that it points out conditions to be avoided.

"Roller Gravity by Lamson" is a handbook that will be an asset in the office of any business that handles materials.

MPM will procure your copy from the manufacturer if you will send a request on company letterhead to Special Projects Editor, METAL PRODUCTS MANUFACTURING, Elmhurst, Illinois.

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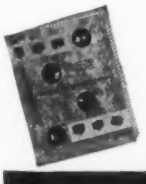

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Hot spray

→ *from Page 68*

spray booth. This method makes possible the use of the lowest possible atomization air, which is not the case when using higher viscosity (less thinner), and where the user attempts to bring the viscosity down with heat alone.

Those who favor this method as described contend that the wasted high viscosity material is more expensive in the long run than the thinner used to reduce the material for normal cold spray application.

It must be kept in mind that there is no generally accepted rule to be applied when switching from cold to hot spray. Each finisher has an individual set of operating conditions to be considered before the changeover can be made. These individual requirements should be reviewed from three standpoints—the finisher, the material supplier, and the equipment manufacturer, before a final decision is made regarding temperature, atomization pressures, equipment, and material.

As can be said for most materials or processes, hot spray is definitely not a cure-all. However, personnel in many plants using the system have indicated enthusiastic approval based on plant operating results.

The MPM *staff gratefully acknowledges helpful assistance given by the following manufacturers: The DeVilbiss Co., Binks Mfg. Co., The Nordson Corp., The Spee-Flo Co., Sherwin-Williams Co. and The Glidden Co.*

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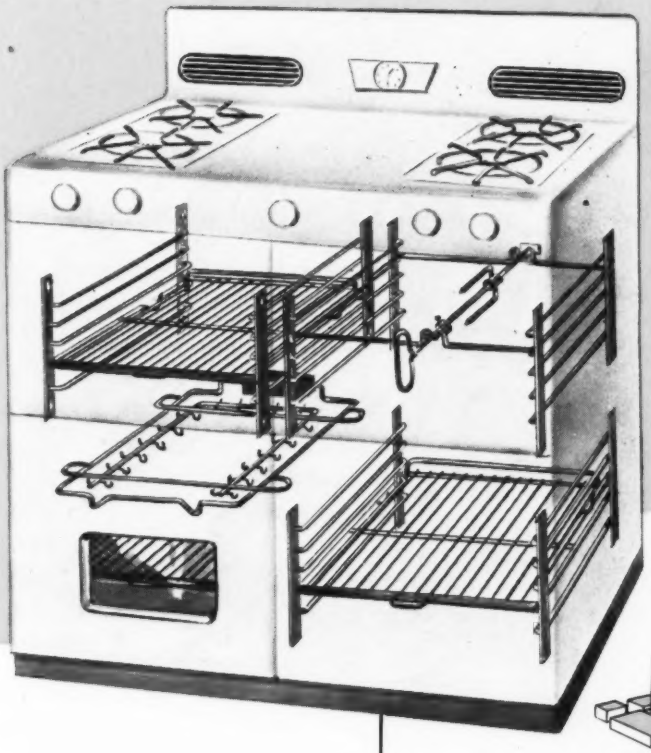

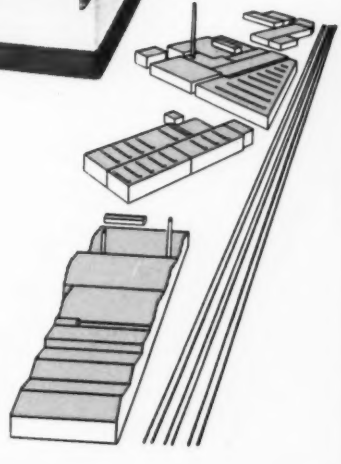

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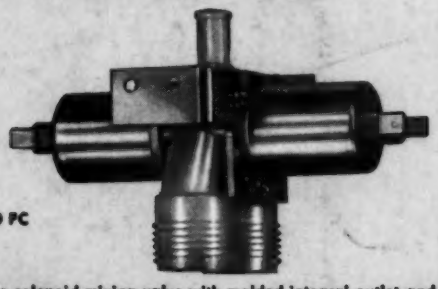
A new double solenoid non-thermostatic valve with molded integral outlet and incorporating the flow control feature in the outlet. Hot, mixed and cold water is provided.

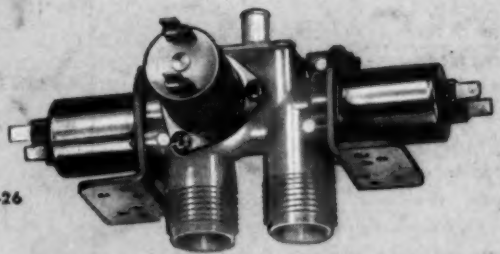


N-10 PC

A two solenoid mixing valve with molded integral outlet and either restrictions or flow controls at each inlet. Provides hot, mixed and cold water. Inlet flow controls give a degree of mixed temperature compensation with varying inlet pressures.

N-32

This non-thermostatic double solenoid mixing valve can be supplied with flow control feature. Provides hot, medium and mixed water.



N-26

A three solenoid non-thermostatic mixing valve, providing control of hot, medium, mixed, cool and cold water. Has flow control feature in outlet and balancing inlet restrictions to compensate for inlet pressure differentials.

N-23

A non-thermostatic mixing valve having a third solenoid for control of cold water to the condenser system of a combination washer-dryer. Condenser water flows from an auxiliary outlet. Water through the main outlet may be hot, mixed or cold. Can also be applied to automatic washers to control water supply and operate a conditioner or detergent dispenser.

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We also produced the first non-thermostatic mixing valve for the same industry.

The first thermostatic valve which also provided cold water for washing or rinsing.

We produced the first valve for condenser clothes dryers.

We were the first to offer the economies resulting from the use of molded nylon valve bodies.

The first valves with integral solenoids were produced by Dole.

Dole designed and sold the first solenoid operated valves for combination washer-dryers including in one package control of wash and rinse water and the water needed for the condenser system.

The first solenoid valves for portable dishwashers were Dole products.

Dole designed the first storage type fabric conditioner dispenser.

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For more than 50 years the problems of control have been uppermost in the minds of Dole engineers. And year after year they have been first with new improvements . . . new developments . . . new ways of doing the job better.

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